WESTERN GAS

April
1929

20 Cents
the Copy

LIBRARY OF CONGRESS
A
10
1929
PERIODICAL DIVISION

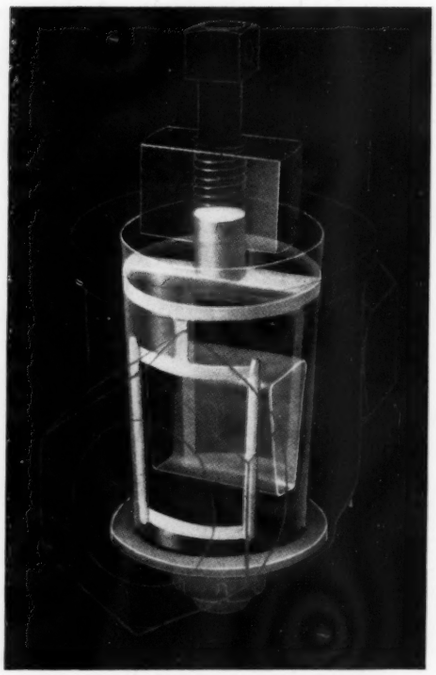
Foshay Tower—a monument to utility service, newly completed by the W. B. Foshay Company, Inc., at Minneapolis, Minnesota, in which city the Mid-West Gas Association meets, April 15-17.

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

Now . . . a genuine *Lubricated* Service Cock at moderate cost

Nordstrom lubricated Service Cocks are especially designed for curb and meter service. They assure a tight shut-off when used as a meter cock in basements and the interior of houses where leakage is dangerous. When used as a curb cock, they provide a quick gas shut-off in emergencies and a tight valve on the service line.

Nordstrom Service Cocks incorporate our patented "Sealdport" principle of lubrication which performs the function of lifting, greasing and sealing the plug by hydraulic pressure. A slight turn of the lubricant screw forces lubricant around and under the plug. When this has been done and the valve turned, it is sealed against leaks and sticking is prevented. The plug can be turned to 360 degrees without allowing the line pressure to force the lubricant out of the valve. A pronounced weakness of the old-fashioned plug cock is overcome by retaining the plug in its seat with a constant pressure at all times, by means of a spring disc and castelated nut which require no adjustment.



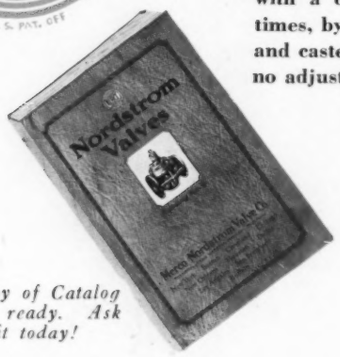
Phantom view of Nordstrom Service Cock showing "Sealdport" method of lubrication.

MERCO

REG. U. S. PAT. OFF.

Special "Merco" Lubricants

Our lubricants are available for a wide range of valve services. They are compounded by us and are recommended for use in all Nordstrom Valves.



Your copy of Catalog No. 6 is ready. Ask for it today!

Merco Nordstrom Valve Company

Subsidiary of The Merrill Company

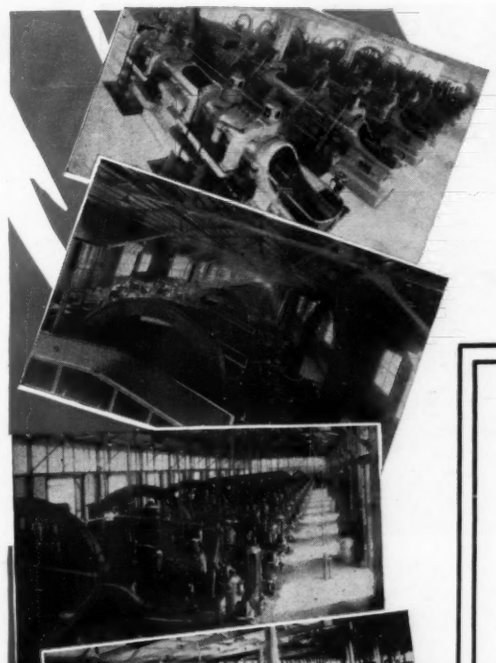
Engineers - - - - Manufacturers

BOSTON—184 Boylston St.
BUFFALO—Genesee Bldg.
CHICAGO—176 W. Adams St.
DALLAS—Magnolia Bldg.
DETROIT—2842 W. Grand Blvd.
HOUSTON—Petroleum Bldg.
LOS ANGELES—556 S. San Pedro St.
NEW ORLEANS—Masonic Temple Bldg.
NEW YORK—11 W. 42nd St.
PITTSBURGH—Clark Bldg.
SAN FRANCISCO—343 Sansome St.
SEATTLE—Colman Bldg.

Agencies in Principal Cities

FACTORIES: Oakland, California and Belleville New Jersey
Canadian Manufacturers—PEACOCK BROS., Ltd, Montreal, Que., Cobalt, Ont., Winnipeg, Man., Vancouver, B. C.
ENGLAND—Audley Engineering Co., Ltd., Newport, Shropshire

NORDSTROM VALVES



This is to tell Gas Engine Users about

the Dollars and Cents
SAVING SERVICE
that follows
COOPERS

A Cooper Engine is never forgotten. Every part, to the smallest bolt and nut, has a permanent record which is kept in fire proof cabinets at the factory. Replace parts for steam engines built fifty years ago can still be furnished today from the original records.

It is not only easy to get replace parts for any Cooper engine, no matter how old: but a Cooper service man is also always available if needed. You can realize how this customer-cooperative combination contributes to the unusually long operating records of Cooper engines. The first Cooper gas engine built in 1909 has been in constant service ever since. The dollars and cents savings of such service is evidenced by the fact that the average maintenance on Cooper engines is less than one per cent per year.

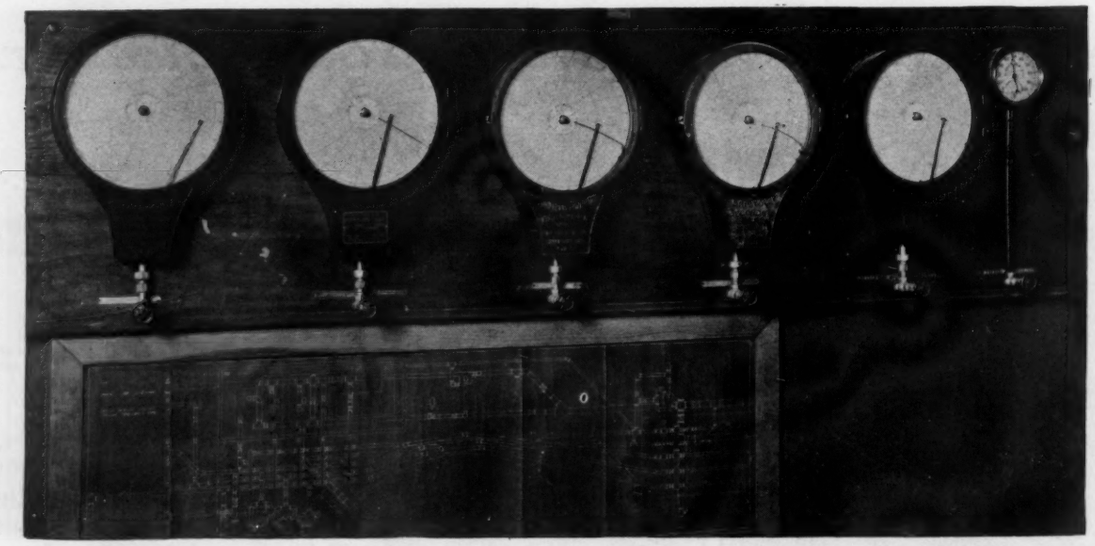
THE C. & G. COOPER COMPANY
MT. VERNON, OHIO

630 E. 61st St., Los Angeles 615 Kennedy Bldg., Tulsa
1116 Magnolia Bldg., Dallas

The Plant behind the Product

COOPER

April, 1929, Volume V, Number 4. WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.



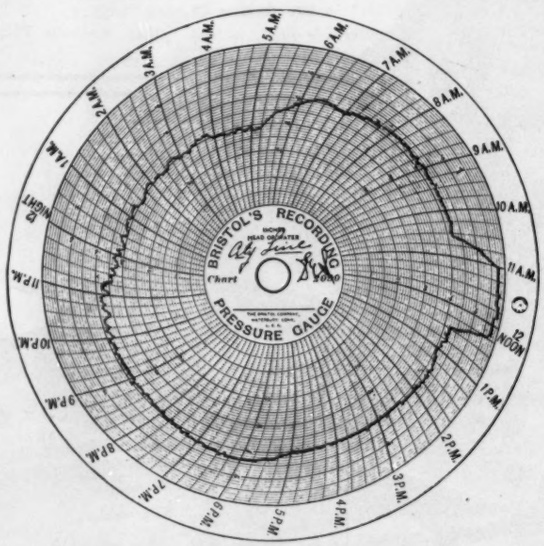
The above installation is used by a large Texas Public Service Company, to check high and low pressures on gas lines in regulator station; also to record pressures on high side of line ahead of the regulator and on low side of the line after gas has passed through regulator

Recording Instruments to aid in Controlling Operating Conditions

IN virtually every process of cleansing or distributing gas; or reclaiming of by-products, economical operation is dependent upon strict adherence to predetermined schedules of pressure, temperature, etc.

To continuously record these conditions; to show what is taking place inside the gas-making, purifying or distributing equipment is the function of Bristol's Recording instrument equipment.

The continuous chart records obtained show clearly the why and wherefore of operating efficiency; pointing out not only where improvement is needed, but—once the correction is made—acting as a guide in keeping things straight.



Reproduction of chart with record, showing variation in city gas pressure over a period of 24-hours. Note how clearly peak load is shown around 11 a. m. to 12:15 p. m.

And testifying to the marked appreciation of what such instrument service can accomplish are the thousands of Bristol installations now in use.

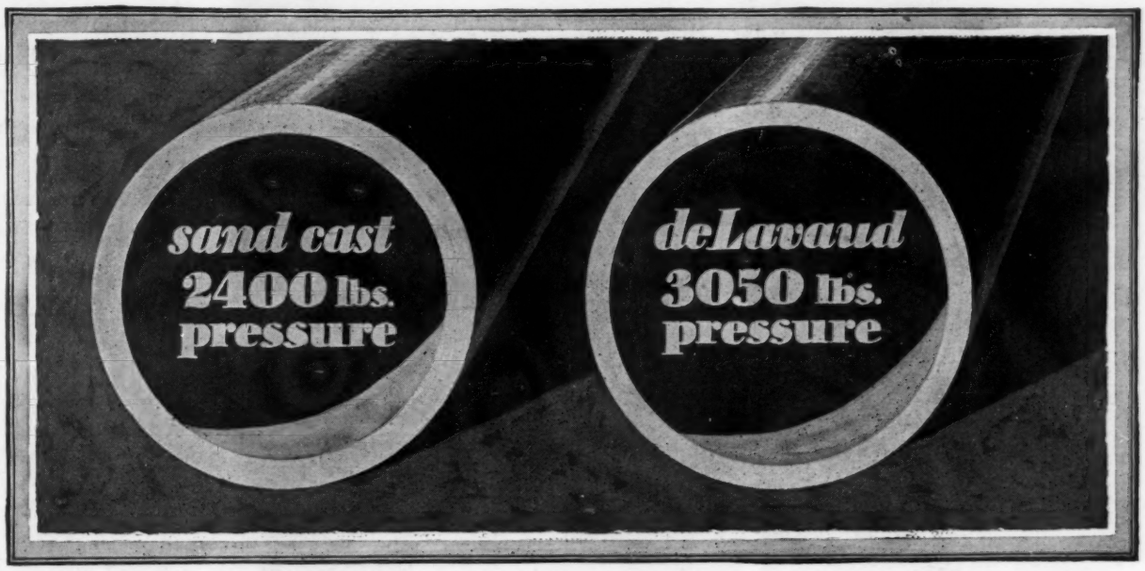
Bristol's Equipment can be furnished to take care of almost any instrument need in the gas industry. Designed with a view to simplicity of operation; having dust-, moisture-, and fume-proof construction, operation should continue accurate and satisfactory for years, with very little care and adjustment.

The BRISTOL Company . . . Waterbury, Conn.

Branch Offices: San Francisco, Rialto Bldg.

Denver **Akron** **Chicago** **New York** **Philadelphia**
Detroit **St. Louis** **Pittsburgh** **Birmingham** **Boston**

It takes 25% greater pressure to burst deLavaud pipe



THE above illustration shows the relative thickness of deLavaud and sand cast pipe. Both have the same outside diameter but deLavaud has the larger inside diameter and therefore, increased carrying capacity. *Yet this thinner deLavaud pipe is at least 25% stronger than any other cast iron pipe.*

In hydraulic bursting tests, deLavaud withstands more than 3000 pounds pressure per square inch—over 25% higher reading on the gauge than "sand cast" pipe attains. This remarkable ability of deLavaud pipe to withstand internal pressure results from the dense, close-grained structure of the metal itself, and freedom from slag and gas bubbles.

deLavaud pipe is made by pouring the molten iron into a rapidly revolving cylindrical mould. Centrifugal force holds the molten metal against the sides of the mould, and drives impurities out of the metal *with a pressure 40 times greater than gravity.*

In addition to its greater strength and uniformity, deLavaud offers greater carrying capacity than other pipe, size for size.

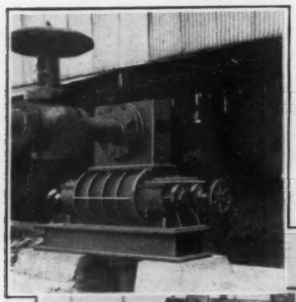
Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

United States Cast Iron Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: Chicago, Philadelphia, Buffalo, Cleveland, New York, San Francisco, Los Angeles, Seattle, Birmingham, Dallas, Kansas City, Pittsburgh, Minneapolis

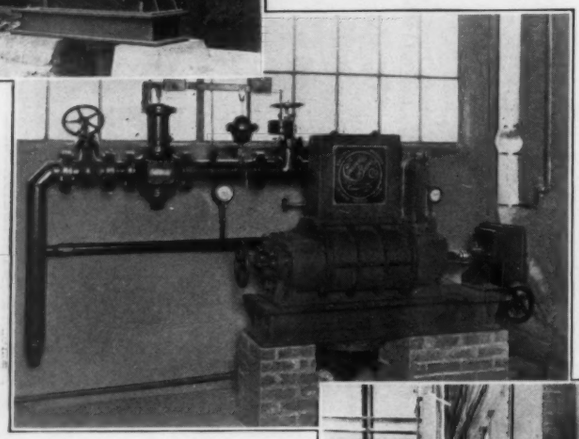
Connersville Meters

are giving dependable readings on industrial and commercial installations

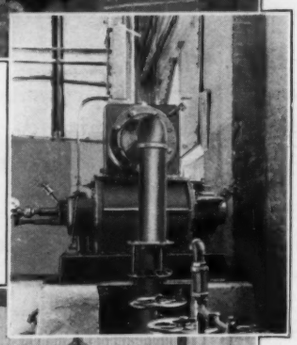


Connersville Meter measuring gas in a steel mill at Birmingham, Alabama. Normal load 20,000 to 40,000 cu. ft. per hour.

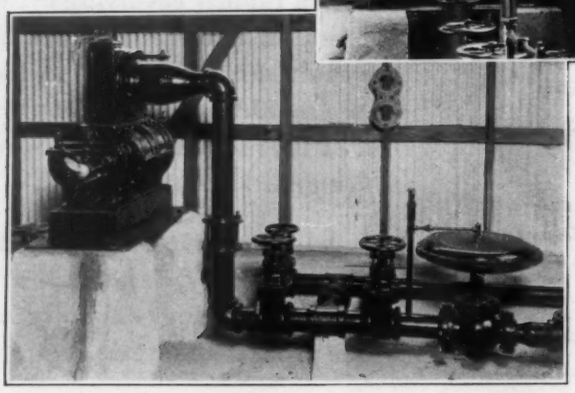
Connersville Meter, installed by Consumers Power Company to meter gas to the Motor Wheel Corporation, Lansing, Michigan.



A 15,000 cu. ft. per hr. Connersville Meter measuring gas to boilers in the natural gas fields.



Another smaller Connersville Meter registering the natural gas consumed under the boilers of a laundry at San Antonio, Texas.



The values that are found in Connersville Meters have already led many gas engineers to recommend the use of them on industrial and commercial installations, in steel mills, metal working factories, in bakeries and other food product plants, on heating installations, etc. These men have found that—

Connersville Meters are accurate, for the displacement is a fixed unchangeable volume.

They are dependable, for all parts are sturdily made from iron or steel, and are not subject to variation.

They are easy to install, a single meter, with its one inlet and one outlet connection can be installed, even for the larger consumers.

They are easy to read, the counter being mounted at a convenient angle, and containing a single set of figures giving a direct reading in cubic feet.

They are easy to maintain in service, as there are no delicate parts to require frequent adjustment.

Bulletin 4D illustrates the reasons for the dependable service of Connersville Meters. It is a new, revised bulletin. Ask for your copy of it.

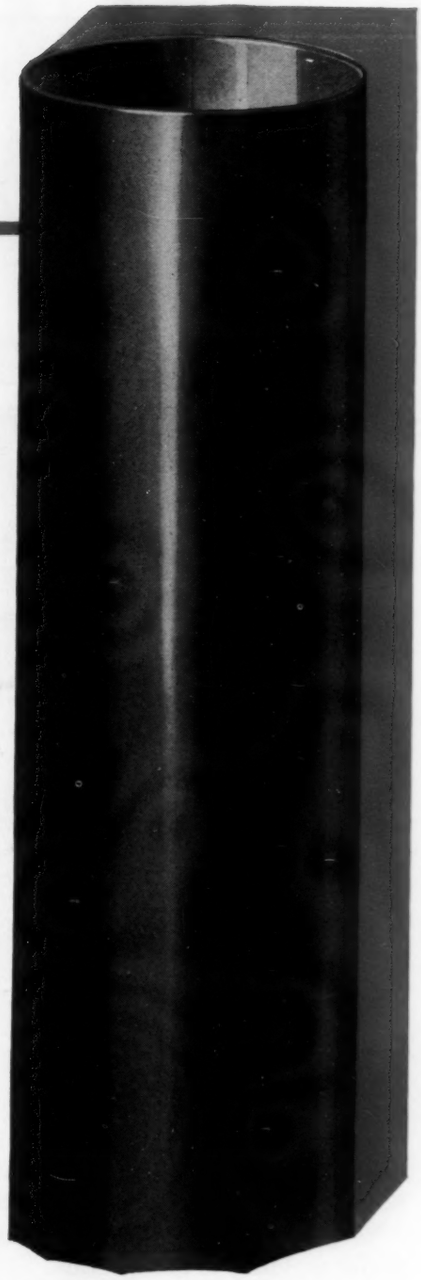
The Connersville Blower Co.

Michigan Ave. at 16th St.
Connersville, Indiana

CONNERSVILLE

Blowers • Gas Pumps • Meters • Cycloidal Pumps

This Good Black Pipe Stays Good Black Pipe



SMITH PIPE IS PICKLED *for* REMOVAL *of* MILL SCALE

It is pickled by a Smith Method just as it is made by a Special Smith Method.

A. O. Smith Engineers have solved the problem of pickling pipe, so that the steel is *unaffected* and all traces of the pickling solution removed.

A. O. Smith Engineers have solved this problem just as they have solved many other troublesome problems for the oil and gas industry.

The result is that SMITHWelded Pipe stays good black pipe because in its manufacture:

The steel is pickled
manufactured into pipe
tested
hot washed
hot dried
painted immediately
on a clean dry surface

There is no adhering scale to chip off, carrying the paint with it. Naturally, there can be no air or water hiding beneath scale to invite corrosion or electrolysis.

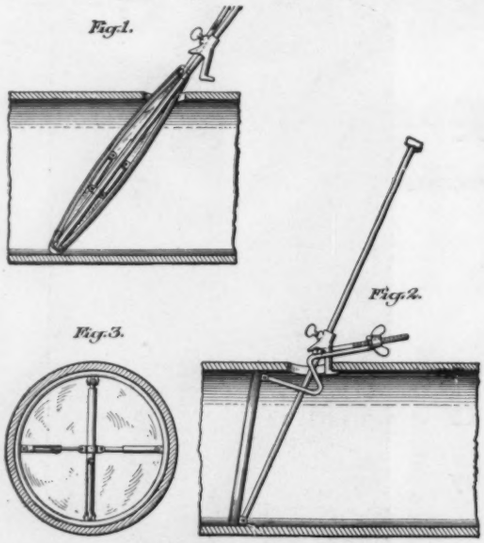
That is why it stays good black pipe.

A. O. SMITH CORPORATION

Oil & Gas Field Products Division
General Offices: Milwaukee, Wisconsin

District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles

SMITH *WELDED* GAS LINE PIPE



Patented and Patents Pending

The Goodman Stopper

used since 1897

With improvements from time to time. Now has a Z-handle and cross-bar backing up the diaphragm.

Locking sleeve holds Stopper firmly in place. Look for the name GOODMAN.

Dependable Gas Main Bags

This is our TYPE C—Canvas-covered Gas Main Bag. It is for use in mains heavily coated with tar or oil, and in other places where a plain rubber bag would not hold. It will hold against a higher pressure than the plain rubber bags.

The canvas-cover is treated to withstand the action of oil and this bag is used in oil lines while welding is being done.

Our gas bag valve and gauge combination is shown in use.

Street Department Supplies

Air-Line Masks
Goodman Stoppers
Gas Main Bags
Plugs, all kinds
Blowers
Gauges "U" Type
Pipe-Cleaning Brushes
Cylindrical Stoppers
Joint Runners
Mittens and Gloves
Soap Tape and Binding Tape
Quick-deflating valves for gas main bags.

Safety Gas Main Stopper Co.

523 Atlantic Avenue **Brooklyn, New York**

Cable Address: Gastopper, N. Y.

Pacific Coast Representative: C. B. Babcock Company, San Francisco, Calif.

BITURINE ENAMEL

THE *Permanent* PROTECTIVE COATING FOR PIPE LINES *in* QUALITY *and* SERVICE

FOR over thirty years Biturine has stood the tests of every kind of corrosive condition known; has defied soil acids, alkalis, moisture and electrolysis, on thousands of miles of pipe lines, on ships at sea, water towers, etc.

Today, Oil Industry pipe line operators know Biturine Enamel for its unvarying quality that gives added years of service to pipe lines with a complete protection against corrosive elements. What many pipe line operators do not know is that this exceptionally well "balanced" coating, made from laboratory-tested and field-proved ingredients that insure greatest permeability, resistance, ductility and tensile strength, costs no more in downright protection than ordinary straight petroleum, or straight coal tar asphalt coatings. As proof of this statement we submit as evidence numerous accelerated tests made by engineers to determine which coating was best to use, none of which showed failure of Biturine Enamel even under the most extreme conditions, as well as over thirty years of actual service in the ground.

The New Mechanical Method for coating and wrapping Pipe

A better, mechanically perfect method for coating and wrapping pipe is now available to progressive pipe line operators through Hill, Hubbell & Company's latest contribution to the Pipe Line Industry, a coating and wrapping machine, several of which have been installed in permanent plants near well-known pipe mills. We will gladly send all available data to those who address Box 1483, Tulsa, Oklahoma.

HILL, HUBBELL & COMPANY

(Division of General Paint Corporation)

Manufacturers of
Highest Grade Oil Industry Paints and Pipe Line Coatings
Factories: SAN FRANCISCO and TULSA

Offices:

SAN FRANCISCO TULSA NEW YORK LOS ANGELES HOUSTON PORTLAND SEATTLE

Experiment with Pipe Protection when You Have Such Proofs as These?

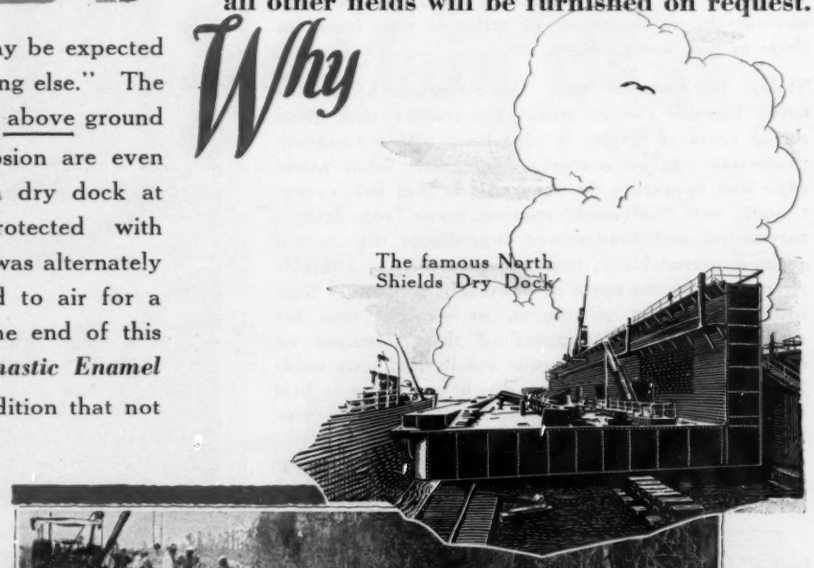
PROOF

PROVEN PROTECTION FOR PIPE LINES

The service rendered by *Bitumastic Enamel* on the North Shields Dry Dock is but one of many proofs which have led engineers to adopt *Bitumastic Enamel* for protection of the largest gas and oil lines in the world. "Why," they reason, and quite rightly, "should anyone experiment when we have such proofs as these?" A complete history of *Bitumastic* performance in pipe line and all other fields will be furnished on request.

"Eventually all underground pipe may be expected to fail from corrosion and from nothing else." The same may be said of metal structures above ground where often the conditions of corrosion are even more severe. The famous pontoon dry dock at North Shields, England, was protected with ***Bitumastic Enamel*** when built and was alternately immersed in salt water and exposed to air for a period of twenty-eight years. At the end of this time the original coating of ***Bitumastic Enamel*** was found to be in such perfect condition that not a single foot of it had to be renewed.

Why



The famous North Shields Dry Dock

THE INTERSTATE LINE

A 22" line laid by the Interstate Natural Gas Company from Monroe, La., to Baton Rouge. 85 miles of the original line, also the extension from Destrehan to New Orleans, protected with BITUMASTIC ENAMEL. Two new locks, under construction, are receiving the same protection.

BITUMASTIC
REG. U.S. PAT. OFF
ENAMEL

Wailes Dove-Hermiston Corporation
17 Battery Place, New York

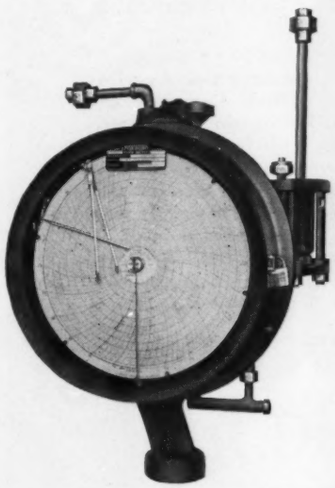
2464 Enterprise St., Los Angeles, Calif. 345 Vermont St., San Francisco, Calif.
Philadelphia Cleveland Chicago Houston Tulsa San Francisco

See Our Exhibit
American Natural Gas Convention
Booths 69 and 70.

The 3½-inch machined steel float that gives the Foxboro Orifice Meter power.

Dirt won't stop this float

THE big 3½ inch float of the Foxboro Orifice Meter has the power to defy dirt and moisture. Consistent accuracy is certain in spite of occasional neglect or unusually severe operating conditions.



The Foxboro Orifice Meter—thousands of these meters are in use all over the world.

No need to worry about calibrating a Foxboro Orifice Meter in the field—we take care of that at the factory. A few drops of mercury, more or less, makes no difference. A simple micrometer screw zeros the Instrument. Uniform pen motion and uniform chart scale give an accurate reading throughout the entire range. The Foxboro Orifice Meter is a powerful, sturdy, accurate Instrument that's built for field service. It asks no favors and gives no alibis. The Guarantee, sealed to each Foxboro Orifice Meter, means just what it says. It is your assurance that the meter will do just what we say it will do.

You can see a Foxboro Orifice Meter in operation at a neighboring outfit, or you can get the story from a nearby Foxboro Engineer. Write or wire the nearest Foxboro Branch today.

THE FOXBORO COMPANY
Neponset Ave., Foxboro, Mass., U. S. A.

Western Offices:
Los Angeles, 443 S. San Pedro St.
San Francisco, 461 Market St.
Portland, Ore., 816 Lewis Bldg.

New York
Rochester, N. Y.
Tulsa
Chicago
Detroit
Cleveland

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

Philadelphia
Boston
Dallas
Pittsburgh
Atlanta
Salt Lake City

Agents East of the Mississippi for Robinson Patented Orifice Flange Fittings

Instruments for Controlling, Recording and Indicating Temperature, Flow, Humidity and Pressure

Fit the Protection to Meet the Need!

That's the advice of Progressive pipe-line engineers

FIRST analyze your soil. Some of it may be bad—black, soggy, or strongly alkaline; another part, sweet as you'd ask for. Obviously you don't need the same amount of protection for both. What would prevent pipe-line corrosion in the first soil would be more than enough for the second—a needless waste.

How McEverlast Cuts Your Costs

Fit the protection to meet the need. That's the McEverlast Plan of pipe-line protection. Where your pipe runs through clean, dry soil just a light coating may be enough! But when it hits a bad stretch—where corrosion and electrolytic action are at their worst—slap on the protection—five coatings including the McEverlast Osnaburg Wrapper and perhaps even a hot coat. In this way McEverlast cuts your maintenance costs to an absolute minimum. You pay only for necessary pipe protection!

Some Present Users

You can't fool the big fellows! When they adopt a product it has to be good in order to pass their tests. Among the present users of McEverlast Protective Coatings are:

Southern California Gas Company, Los Angeles Gas and Electric Company, Shell Company of California, Pan-American Petroleum Company, Sun Oil Company, Simms Oil Company, California Petroleum Company, General Petroleum Company, California Eastern Oil Co., Western Oil and Refining Company, Richfield Oil Co., Industrial Fuel & Supply Co., Chanslor-Canfield Midway Company, Union Pacific Railway, Hercules Gasoline Company, City of Los Angeles and twenty-nine other cities in the Southwest.

Write today for new booklet "Protecting Pipe Lines and Exposed Metal Surfaces with McEverlast Protective Coatings." Just off the press!

McEVERLAST, INC.
[T.M.REG.]

111 West Seventh St., Los Angeles, Calif.

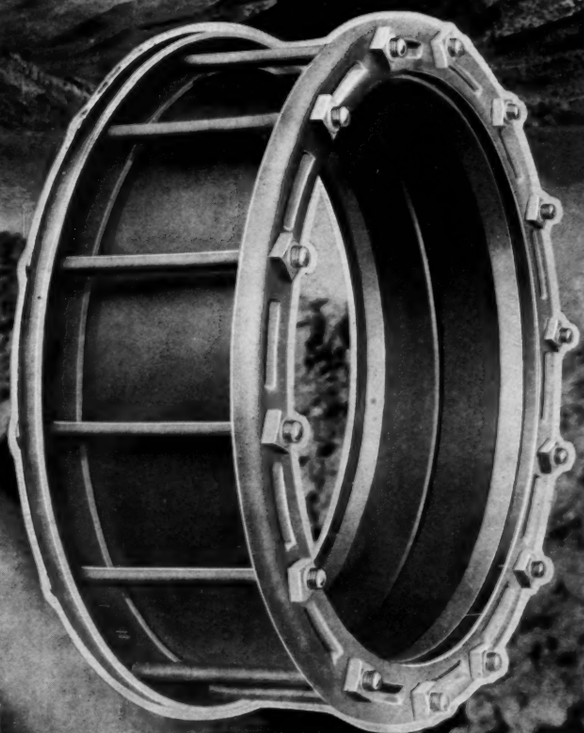
Branches

35 E. Wacker Dr., Chicago, Ill. | **1754 Graybar Bldg., New York, N. Y.** | **1314 Magnolia Bldg., Dallas, Texas.**

Offices in: Kansas City, St. Louis, Boston, Phoenix, Pueblo, Seattle, Honolulu, San Francisco.

DRESSER Couplings DOMINATE!

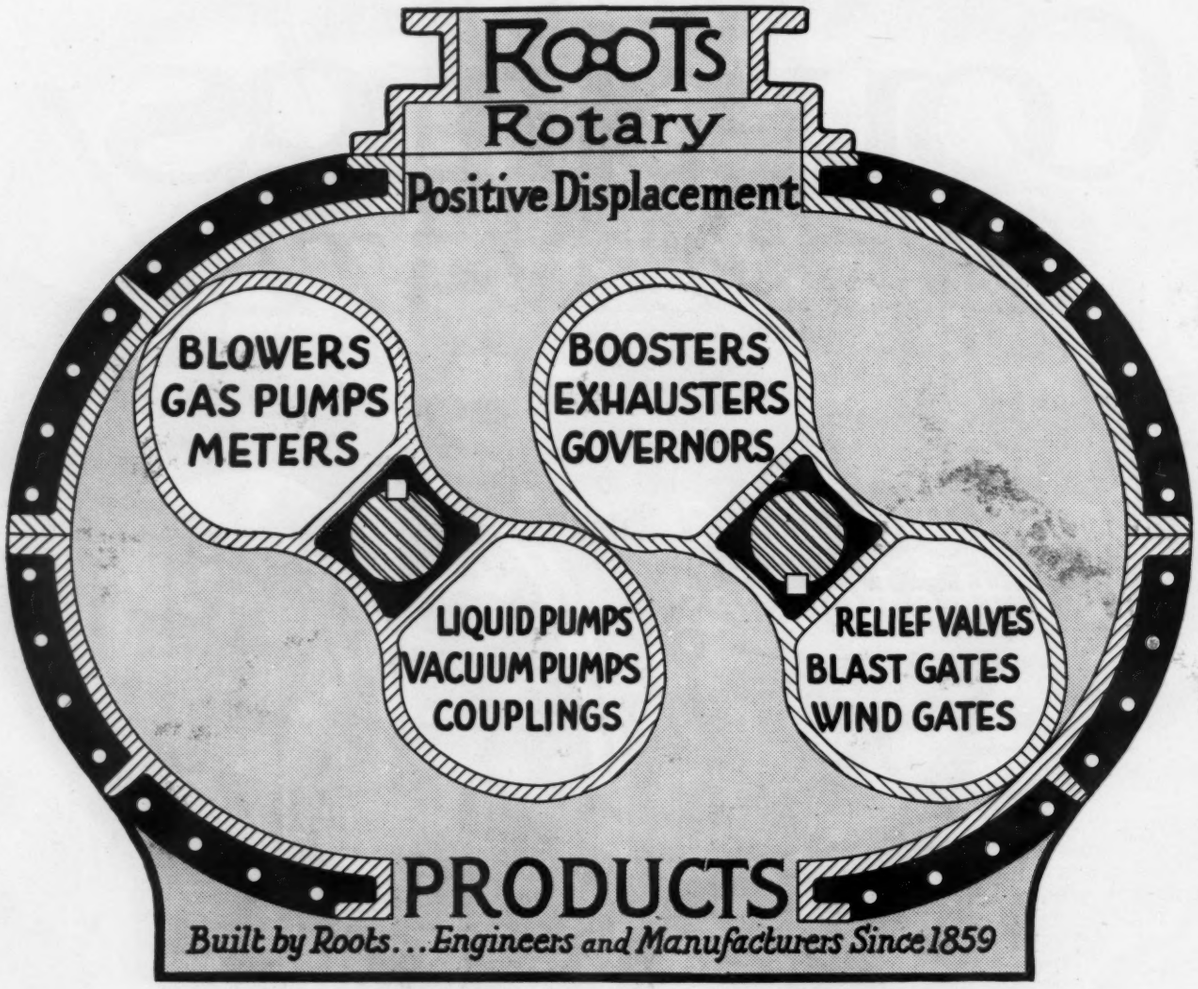
'Cross the Plains
-&-
O'er the Rockies



S.R. DRESSER
MFG. COMPANY
Bradford, Penna.

ROOTS

Roots of Connersville



The fact that The P. H. & F. M. Roots Company has been in business since 1859 has added significance when it is known that some of the early Roots Blowers are giving reliable and dependable service today. Specify Roots equipment by the name *"ROOTS"* to prevent substitution of imitations.

Western Representative: Sutor & Co., 2008 East Slauson Ave.
Los Angeles, California

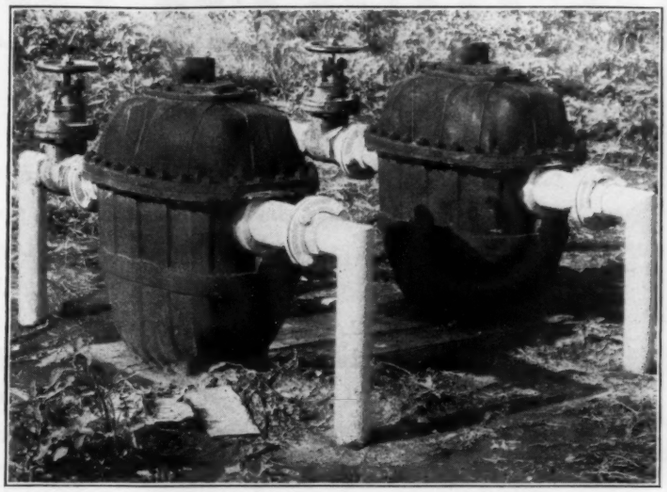
The P. H. & F. M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle



Built for the Job They Do

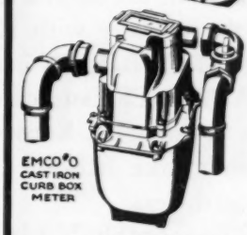
THESE two EMCO Number Four Large Capacity gas meters measure gas to the Pipe Line Department of a large gas company in Texas.

If it should become necessary to clean, adjust or repair the EMCO Number Four it can be done right in the line. Remove the cover plate and the entire assembly lifts out, and if desired, can be replaced by a spare assembly. All parts are interchangeable so that there is no delay when overhauling jobs are necessary.

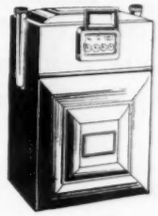
EMCO—*wherever you go*

EMCO #0 CAST IRON DRY GAS METER

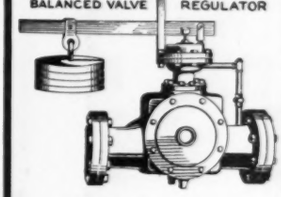
IRONCLAD CAST IRON DRY GAS METER



EMCO #0 CAST IRON CURB BOX METER

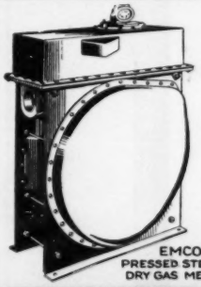


EMCO TIN METER



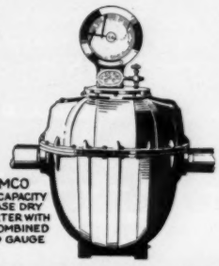
EMCO HIGH PRESSURE BALANCED VALVE REGULATOR

EMCO WATER HEATER AND GAS APPLIANCE REGULATOR



EMCO #5 PRESSED STEEL TYPE DRY GAS METER

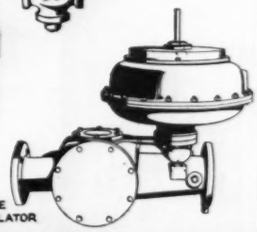
WESTINGHOUSE FLUID POSITIVE GAS METER



EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE

EMCO ORIFICE GAS METER

EMCO DOMESTIC SERVICE REGULATOR



EMCO LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY

It Sounds like *FICTION*

NOT one in more than *five million* bills returned with an error.

This extraordinary record of accuracy made by one of the largest Public Utility Companies in the country with REMINGTON PUBLIC UTILITY BILLING AND BOOKKEEPING MACHINES can scarcely be believed. To all but those who know Remington accuracy it sounds like fiction. Unusual? Yes. But true, nevertheless.

The monthly bill is perhaps your only point of contact with your customer. It must be accurate, neat and easily understandable. That's why you need a Remington.

But it's not the only reason. Remington offers you another distinct advantage. A special bookkeeping system, known as the Register Sheet Method of Ledgerless Bookkeeping. It cuts filing space in half. Positively prevents misfiling. Increases billing and posting volume through undreamed-of speed. It supplies you with complete information concerning any customer's account . . . instantly available for comparative statements, adjustment of complaints, etc.

For further particulars about this machine write for Special Public Utility Accounting folder or phone our nearest office for a demonstration.

Accounting Machine Division

Remington Rand Business Service *Inc.*

Buffalo, N. Y.

Branch offices in all principal cities

Accounting Machine Division, Remington Rand Business Service *Inc.*, Buffalo, N. Y.

You may send me additional information regarding Remington Public Utility Billing and Bookkeeping Machines.

Name_____ **Address**_____

City_____ **State**_____

W. G. J-4.

WESTERN GAS

307 Thomas Building,
Dallas, Texas
Phone 2-8708

447 Sutter Street
San Francisco, Calif.
Phone GArfield 2772

Publication Office, 124 West Fourth Street
Los Angeles, Calif. Telephone TUcker 8982

Contents for April

	Page
In the Front Line Trenches — *By E. L. Hall*	17
Engineering Aspects of Industrial Gas Salesmanship — *By Lee Holtz*	19
Use of Commercial Hydrocarbon Processes in the Gas Industry — *By W. W. Odell*	21
A January Water Heater Campaign Which Got Results — *By H. E. Davidson*	25
Pacific Coast Gas Association	26
Editorial	28
Overall Economy Gives Gas the Advantage in Hotel and Restaurant Sales — *By I. L. Heckinger*	29
With the Metermen	30
Automatic Regulation Keeps Pace with the Industry's Rapid Advance — *By William S. Waldrip*	
Western Gas Salesmen's Competition	36
This Month's Patents Pertaining to the Industry	39

JAY JENKINS
Publisher

GEORGE H. FINLEY
Managing Editor

ELLIOTT TAYLOR
San Francisco Manager

CRAIG ESPY
Mid-Continent Manager

Volume V **April, 1929** **No. 4**

Official Publication: The Pacific Coast Gas Association; Southern California Meter Association

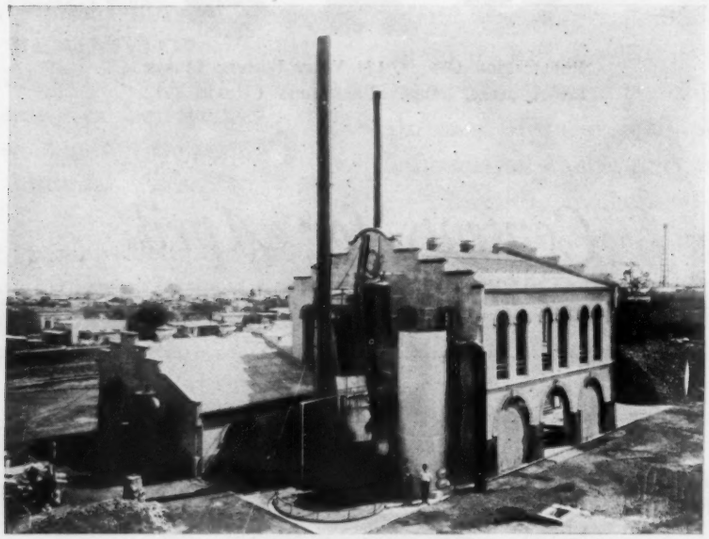
Western Gas is published by Western Business Papers, Inc. at 124 West Fourth Street. Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second-class matter June 1, 1925, at the postoffice at Los Angeles, California under the Act of March 3, 1879.

Copyright, 1929, by Western Business Papers, Inc.

Western Gas *is fully protected by copyright, and nothing that appears in it may be reprinted without permission.*

AT ROSARIO

ARGENTINE REPUBLIC, S.A.



New Carburetted Water Gas Plant

THIS new plant, which was designed and built under our direction at Rosario, is modern and complete in every detail and is operating at exceptionally low cost. Representing the latest word in this type of plant, it is typical of the work we have been doing in the gas industry for generations.

Other carburetted water gas plants built by us in South America include those at Rio de Janeiro and two at Sao Paulo.

THE U. G. I. CONTRACTING COMPANY
DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS
INCORPORATED
DWIGHT P. ROBINSON, PRESIDENT
Broad and Arch Streets, Philadelphia

Chicago Atlanta

WESTERN GAS

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

SAN FRANCISCO LOS ANGELES DALLAS

On *the* Front Line *of* Defense

The Industry's "Shock Troops" are Stationed in the Pacific Northwest—Strategic Point in the Battle of the Fuels

By E. L. HALL

General Superintendent, Portland Gas and Coke Company

AS a contribution to the "nation-wide survey" from the Pacific Northwest, the following paper was delivered by Mr. Hall on the program of the American Gas Association Advisory Council and Executive Board Conference at Los Angeles in February.

The author tells, from long familiarity with conditions in the Northwest, of the many forms of competition which place gas men upon their mettle in that section, and suggests a few of the means being adopted to meet the situation.—*Editor.*

A STEADY, if slow, growth has been experienced by the gas industry in the Pacific Northwest, and this in the face of the most strenuous competition which has been experienced by the gas industry in any section of the country.

Curiously enough, no two in the Northwest are meeting the situation in the same manner nor even with the same enthusiasm. Just as in all business enterprises, the personal element plays a large part and one finds certain localities in the Northwest which are more than holding their own and in fact achieving substantial progress. At the same time it must be said also that the competitive conditions in some cities of the Northwest are a great deal more acute than others. This is particularly true in those cities having municipal electric plants, where rates are frequently below the cost of service.

E. L. Hall

In this battle of our industry to hold and improve its position, surely it may be said that the Northwest represents the front line trenches. Notwithstanding that most of you are familiar with these conditions, I will enumerate some of them and present a few thoughts as to how some of us are trying to meet the situation.

Just like the apple grower in our famous Hood River Valley, who, when asked what forms of orchard pests he had to contend with, replied, "Well, I haven't seen any tarantulas yet, but I still have hopes," we think similarly of our Northwest gas industry that we have every variety of competition, but there may possibly be others that we haven't heard of yet.

Cheap wood, mill waste, sawdust, low priced coal, and, considering the distance from the oil fields, cheap oil and distillate, and last but not least, the electric competition from our great hydro-electric resources.

Wood products in their various forms still represent the greatest domestic source of fuel. The by-products of our lumber mills are frequently delivered to the householder at but little above the cost of cartage. Of considerable importance in this connection is the recent perfection of the sawdust burner, releasing and making available an unbelievably cheap source of fuel for heating homes. The one redeeming feature concerning the sawdust competition is that the supply is limited. This is, however, not true of mill waste in the form of slabs, waste lumber and box wood.

The coal situation likewise presents a formidable picture owing to the large quantities of cheap, low grade, high ash coals which are offered freely at prices as low as $7.50 to $10.00 per ton. Neither has the coal situation been improved from the standpoint of the gas industry by the introduction of mechanical devices for stoking coal in domestic furnaces.

At the same time, the over-production of oil in the California fields and the policy of the large oil companies to merchandise oil at retail prices but slightly higher than paid by the large consumer, has enabled the householder to heat his

home through many of the automatic oil burners now on the market at a minimum of expense and a maximum of convenience.

Recapitulating the solid fuel situation, the two factors that are making competition from this source in the Northwest more acute may be summed up as being, first, the over-production of these fuels tending to very low prices, and secondly, the recent development of mechanical devices for utilizing such fuels efficiently and conveniently, thereby robbing gas of one of its biggest advantages.

Fortunately, however, for the gas industry the competition from the above sources is not well organized or directed and the main disadvantages of solid fuel or inherent to solid fuel, are still largely present. At the same time the mechanical devices are expensive, not altogether free from hazard and are complicated and require a good deal of maintenance.

In a review of this character, space forbids going into detailed comparisons of cost and convenience.

I have reserved to the last our greatest competitor, electricity. While solid fuels present to the gas industry formidable competition in the househeating such as has not been the case in domestic cooking and water heating, which still comprises the great bulk of our load. It is in this field that electricity has made serious inroads.

IT IS not so much that electrical cooking is cheap. It isn't. It is mighty expensive. It is also slow and the appliances are expensive both in first cost and maintenance. But it is modern and is fashionable.

There lies the rub. The attack that electricity makes upon gas is largely psychological. The appeal to the housewife is in being up-to-date. With our modern gas ranges having everything of beauty and convenience and much more of economy and speed, it is hard to see where the electric range offers to the housewife any real advantage. But one must always remember that behind the electric range is the electric industry, highly organized, efficiently managed and assisted by propaganda with which the gas industry has been unable to cope.

I am indebted to Mr. J. L. Stone, General Manager of the Spokane Gas and Fuel Company, for the following thoughts. I cannot do better than to quote Mr. Stone.

"The people of the Northwest States, beginning with Utah, where there is a great abundance of developed and undeveloped water power, too generally believe that electric service is scheduled to replace gas service in every field of activity. They do not know that a large percentage of the manufactured gas sold goes for industrial purposes. They do not know that many industries must have gas service and would not locate in a community where they do not have adequate gas service at attractive rates.

"The thought in these Northwest States too generally prevails that to be up-to-date, one must have complete electric service. This is evidenced by the many people who change from gas to electric service from time to time who are thoroughly satisfied with their gas service, but who install electric service because of that false impression. It is also evidenced by the installation in practically all new homes in many of the Northwest cities and in all new apartments in these cities of electric ranges instead of gas ranges.

"To many of these people, the price of this service is not the real factor. It is the false notion that, some day, there will be no need for gas service and electric service will take its place.

"When, in several of the cities of the Northwest, electric service is sold for nine mills or less for electric cooking and water heating, or $2.64 per million B.t.u. or less for this service, you can realize that some gas companies must make substantial reductions in their rates after they have taken into account the relative efficiencies of the two services.

"While this condition is more severe in the Northwest than in any other section of the country, still, if you will read the statistics, you will find that electric service is becoming more popular in many sections of the country East and West, the Northwest country being an example for the rest of the nation, spreading the propaganda faster than the members of the gas industry realize.

"In as extensive a way as we possibly can here, we have been trying to put over the point that a healthy, growing gas industry is a necessity in any city if it is to become an important payroll city and I think that matter is so important that the Pacific Coast Gas Association and the American Gas Association could well afford to go after this thing before it is too late and before the condition, which now exists in the Northwest, includes a much larger territory.

"As you know, it really is not a fact that water power companies can afford to take on poor load factor business at ridiculously low rates any more than the coal-fired steam plants can afford to take it on, and you know that no longer do the water power plants have an advantage over the coal-fired steam plants as to the cost of production—but the people do not know this. The people in these water power states have the old thought, because water power was once cheaper to produce than steam power, that it still is the lowest priced and, therefore, that the Northwest country with its immense undeveloped water power will, naturally, some day, use that service exclusively."

In concluding his remarks Mr. Stone suggests the slogan, *"Let us make gas fashionable."*

What has been said regarding electric competition for the cooking load applies with even greater force and with far less justification to the efforts of the electric companies to annex the domestic hot water load. Here the appeal to the householder is not so much aesthetic as financial.

THE rates for electric hot water service which are offered in many of the Northwest cities are in many cases less than those for gas service. The writer has never seen any analysis of the cost of this service to the electric companies that would justify such rates. It is very doubtful whether such service returns the out-of-pocket cost occasioned thereby.

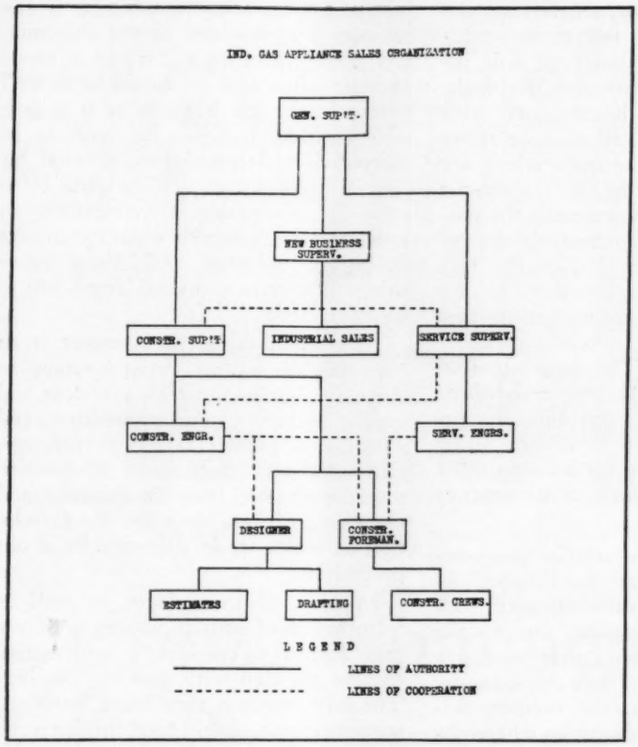
On the other hand, there is no question of the ability of the gas industry to render a superior service to the consumer in this class of business and return more profit. Particularly is this true when flat rates are quoted for hot water service. If forced by competition the gas industry can and will hold this business but it will entail a sacrifice of profits for which there should be no occasion.

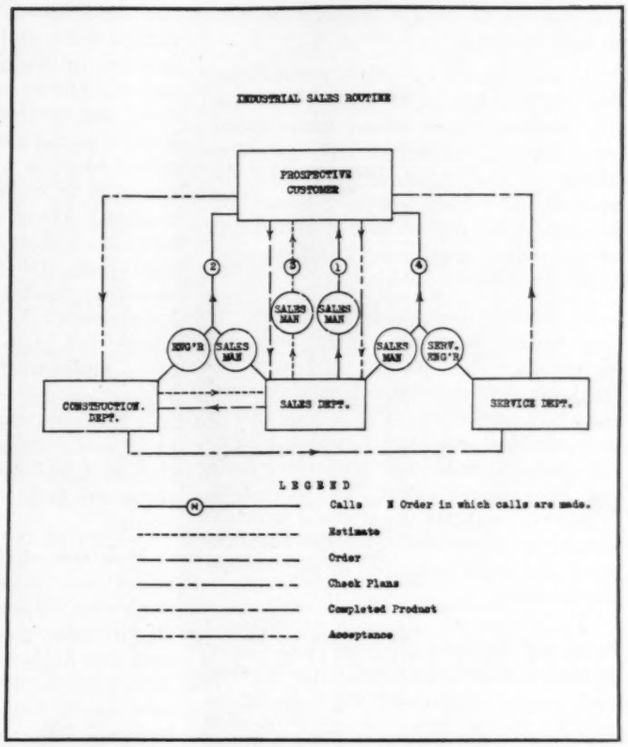
If and when the gas industry is forced to such a step, the electric industry will find an idle investment on its hands while the gas industry may be doing business at a loss. Is it ethical or politic for the electric industry to give away its product in order to wreck a companion industry?

I am expressing only my own personal opinion when I venture to suggest that other consumers of electricity, such as for instance, power consumers, might conceivably create a very embarrassing situation for the electric utilities if they are able to prove that their rates for much larger consumption are far in excess of those charged for domestic hot water service. This may be considered the more pertinent because of the agitation in certain cities of the Northwest for lower power rates comparable to those quoted in other cities having municipal electric plants.

Last but not least of the features behind the electric competition are the municipally owned and operated electric plants in several of the Northwest cities. Obviously their ability to quote lower rates is because the difference is made up by the public at large. In some cases municipal plants are selling current at

(Continued on Page 41)





Diagrams by the writer, suggesting, on the left, a set-up for an industrial gas appliance sales organization, and, on the right, interrelations involved in industrial sales routine.

Engineering Aspects *of* Industrial Gas Salesmanship

By LEE HOLTZ

*General Superintendent, Manufacture and Distribution, Southern California Gas Company**

GENERALLY speaking, engineering is the science and art of designing and superintending the execution of works of a constructive character. Engineering is a science based on cold facts and in any direction we may chance to look we see results that are responsible to this honorable profession's efforts.

We of the gas fraternity, of course, have always been very closely connected with the engineering problems of gas manufacturing, compressor plants transmission and distribution system and we have made wonderful progress in the past 20 years in this respect. However, along with this advancement has come modern engineering and scientific methods in our oil and gas fields which have resulted in an abundant supply of natural fuel that has expanded our business possibilities almost beyond comprehension, and a better opportunity than that which presents itself at the present time will perhaps never occur again.

We of the Pacific Coast find ourselves most fortunately situated in the midst of plenty and have available a most fertile industrial field that to date has only been scratched. We are blessed with both quantity and quality and are in a position to step into broader fields and obtain a class of high rate business that will in the greater part remain with us for all time to come; and with an immediate properly combined engineering and selling procedure, we should in the near future take authoritative leadership in all classes of industrial heating problems, besides sharing our portion of the business available.

There has in the past been a great deal of discussion on the question of the stability of the higher classes of business at the present time being put on by companies serving natural gas where rates are more or less at a minimum and the heating values are high. In other words, when natural gas is gone and we return to manufactured gas, what will be the outcome? Will we retain this business?

If we enter the field of research at once with first class engineering departments, purposely set up to do this work, and continue with this activity, there will be no question but that we will have advanced in the application methods to the point whereby the additional costs and other obstacles that have in the past presented themselves will be overcome and will be in a position to meet all problems on a stable footing.

The fundamentals of selling are practically the same in all lines, except that with each year they become a little more difficult. Our selling forces have more products to compete with. There are organizations selling at cut prices, and many other obstacles that tax the ingenuity of our new business departments. In other words, the customer's dollar is becoming somewhat difficult to obtain and only through the medium of modern engineering and scientific research into selling and appliance meth-

* Delivered before the Technical Section Conference of the Pacific Coast Gas Association, at Los Angeles, Calif., March 21, 1929.

ods will we of the gas industry be able to hold our own.

A few years back when natural gas was more or less in its infancy and was not commonly used in our manufacturing districts, manufactured gas was about the only gaseous fuel that the manufacturer knew anything about and in many cases, due to lack of knowledge of the proper application and high cost, it was prohibitive for his use.

In time natural gas began to find its way toward industrial centers and, due to the fact that it was sold at a remarkably low rate, opportunities opened up which made it feasible to experiment and develop equipment which might otherwise have been a long time reaching its present state of usefulness. Therefore, natural gas without question should be given credit for the advancement and high standards of our present day business.

Today we are doing a tremendous industrial business all over the country in both manufactured and natural gases, and receiving justified rates applicable to the various classes of industries that are being served. However, we have just begun to penetrate what is yet to be done, and to really accomplish what we have all set out to do, we must organize our Industrial Sales Departments on a broader scale. We should combine with our Industrial Sales Department a well defined engineering department consisting of designing engineers, draftsmen and construction crews manned and supervised by capable men, specially trained in this particular class of engineering. This thought is not original by any means. Some of our largest manufacturing companies have had technical departments set up for the service of their customers, and are profiting from this development.

Our industrial business is of a process nature and is, of course, technical and, therefore, should be handled by men with technical training. The men calling on this class of trade should be engineers with engaging personalities, neat in appearance and exceedingly versatile in industrial lines, speaking the language of industry and, above all, honest with themselves.

A great deal has been said in connection with the above advice. However, it is a subject that requires considerable emphasis—particularly in the statement that a salesman should speak the language of industry and be honest with himself. There perhaps is nothing more impressive to the customer than to have a sales engineer refer to his business in terms that are commonly used in his business. By this we mean that every class of industry has its own phraseology, and the salesman who understands the various terms and can talk to the manufacturer in his own language will invariably receive a more attentive audience; and insofar as being honest with himself is concerned, all that he is required to do is present facts, which are the basis of engineering, in a clean-cut manner. Many salesmen make the mistake of making misrepresentations or misleading statements due to the fact that they hesitate to say they do not know or they do not understand in cases where they might be expected to know or to understand. The cooperation of a well balanced engineering department will eliminate most of this difficulty, for as a usual thing two heads are better than one, and pooling the knowledge of salesman and engineer will produce results.

It is true that the smaller gas companies are somewhat handicapped in employing industrial sales engineers with all of these qualifications, due to the fact that it is not absolutely necessary to employ this type of man for domestic sales work; but as a rule, industry follows the larger communities where the larger gas properties are in existence and sales forces of engineering character can be maintained. With this in mind, and permitting the larger companies to take precedent in our general problems, let us first consider the present general practice in our industrial gas sales effort.

Perhaps with but few exceptions, our present industrial salesmen are men with technical training, have engaging personalties and plenty of energy, and have as a whole done some very wonderful work in promoting our industrial gas service to the high standard that it is today. But have we not expected more from them than was perhaps best for ourselves and our customers?

Are we not expecting considerable of the sales engineer when we expect him to act as salesman, designing engineer, draftsman, construction engineer, and service engineer? In many cases on top of all this detail, he is often compelled to follow through on all materials that are necessary to complete the job he has sold and to give the customer that for which he is paying and has the right to expect. With this method of procedure, we have learned from experience that many mistakes are made and a great deal of time is lost, much to the dissatisfaction of the customers, and very often the loss of business results.

The real function of the sale engineer is to make contact with the public, find prospects, and then by clean-cut sales methods to sell himself, the company and his products, and still further, to do all within his power to keep the job sold. In other words, he is the company's ambassador to the customer, and is to protect the rights and interests of both. It is true he should be as well versed in the gas business as it is possible to make him, for he must, to be successful, understand exactly what his client's problems are. This quite often entails considerable investigation in order to collect suitable data, for correct designing, economy and many other things that require special detail are to be considered.

As a usual thing, the prospect is an open-minded business man anxious to cut costs, but he must have a clear and concise picture of our proposition, and in order to present a true picture, certain necessary technical information must be obtained from the customer and elsewhere. These data are the foundation on which we intelligently build our proposition.

In view of these facts, as well as many more of similar nature, is it not then logical to combine a construction engineering staff with sales engineering? The sales engineer then has a better opportunity and more time to keep his prospects alive and to close sales. He receives valuable information from his associates on the construction end that will assist him in his sales arguments. He is using that special tool for which he was chosen—personality—to open up new fields. He is sharing responsibility with others and is relieved of much grief and worry, which will keep him better fit mentally to meet new prospects.

On the other hand, the customer becomes more impressed. He is well aware of the fact that no one man can be a jack-of-all-trades and he certainly does not expect this of a sales engineer, but he does expect results, and quite promptly, too. When he sees the sales force of any company backed up by a technical department, he has more confidence.

No doubt there are young sales engineers who would feel with such a set up that their ability was being reflected upon, whereas, in reality, their position and prestige with the customer would be strengthened and, in addition to this, they would have a better opportunity to broaden their vision and accomplish a great deal more than when they are compelled to work alone.

After all, the customer is looking to the salesman that sold him the job for results and with the assistance of the properly set up engineering staff he can without question operate more intelligently, care for a greater volume of business, and all jobs can be completed more satisfactorily and at less cost to the gas company as well as the customer.

(Continued on Page 27)

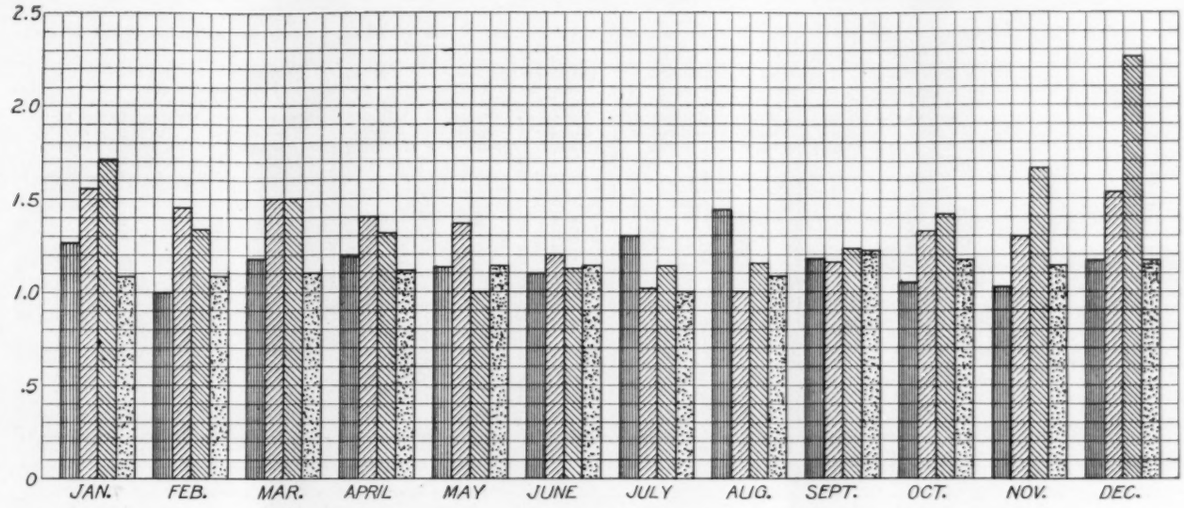


Figure 1—Relative monthly changes in send-out of gas by certain gas companies distributing manufactured gas in some of our large cities for a period of one year

Use *of* Commercial Hydrocarbon Processes *in the* Gas Industry

By W. W. ODELL

Fuel Engineer, U. S. Bureau of Mines

WESTERN GAS readers will remember Mr. Odell's authoritative article summarizing a year's research conducted by him on fuels available for gas-making in California, published in our issue of August, 1926. The present paper reviews current knowledge bearing on use of synthetic hydrocarbon processes in making city gas, and points the direction which future research must take if these processes are reduced to practical usefulness. It is published by permission of the Director, U. S. Bureau of Mines. (Not subject to copyright.)—*Editor.*

For references see Page 44.

ENGINEERS interested in the manufactured-gas industry have witnessed pronounced improvements in gas-generating equipment, and marked changes in operating procedure during the past decade. In spite of these changes, however, the trend of development in the near future seems to be doubtful. Uncertainty exists mainly because no one can yet accurately calculate the number of years which will elapse before petroleum products become too expensive for general use in making gas. Research in this field has been active, and the ultimate results are awaited with interest. Some engineers predict that in the future coking coal will be carbonized on such a large scale that coal gas will be used (straight or modified) for city distribution; others maintain that gas oil will be used in large quantities in the production of base gas; they believe that it will be economical to use oil even at appreciably higher prices. The question involves, among other factors, consideration of initial and relative costs of equipment, flexibility of operation, salability of coke, cost of distributing different gases, and the relative value of by-products. It is common belief that for many years large quantities of oil will be used in gas-making, particularly in the generation of peak gas or that water gas will be used for the synthetic production of hydrocarbons to enrich additional water gas. In this paper interest centers in a discussion of the practicability of employing synthetic processes in view of reported investigations of the chemistry of the synthetic reactions.

For many years it has been known that the chief components of water gas would react chemically under proper conditions to form methane. As long as 1903 a patent[1] was issued in this country for a gas-making process which included the synthetic production of methane. More recently the studies of numerous investigators here and abroad have shown that besides methane it is possible to produce other paraffins, olefins and additional materials adaptable for enriching water gas or for other uses. The question arises: In what manner, if at all, can such processes be incorporated as a part of the gas-making scheme in a city-gas plant?

Products that may be formed by synthesis from water gas ($CO+H_2$)

Procedure: Although the details of various tests and experiments are recorded elsewhere[2] familiarity with the general procedure of the laboratory investigations from which important deductions have been made is pertinent to the understanding of the conclusions; hence a brief outline is presented here. The practice has been to cause carefully purified $CO + H_2$, mixed in predetermined proportions, to pass under a definite pressure into contact with a particular catalyst, which is usually retained in a suitable (usually a very small) tube. The rate of flow of the gaseous mixture is controlled and its composition and volume before and after passage through the catalyst tube are determined. Some of the reactions which may thus occur, and which are of interest in relation to the gas industry, are as follows:

$$CO+3H_2=CH_4+H_2O \quad (1)$$
$$2CO+2H_2=CH_4+CO_2 \quad (2)$$
$$CO_2+4H_2=CH_4+2H_2O \quad (3)$$

Reactions (1)—(3) occur at atmospheric pressure in the presence of nickel catalyst. Optimum temperature approximately 330°C. (626°F.)

$$CO+2H_2=CH_3OH \quad (4)$$

Methyl alcohol

Above reaction (4) occurs at very high pressure in the presence of zinc oxide-zinc chromate catalyst.

Table 1.—Composition, calorific value, and specific gravity of water gas and enriched gas, and thermal efficiencies of conversion and volume yields of methanated (enriched) gas made according to equations 1 and 2.

	Water Gas from coke generator fuel	Residue gas after reaction 1 has occurred.			Residue gas after reaction 2 has occurred.		Methanated gas made to a standard of 500 B. t. u. per cubic foot by reactions 1 and 2.		
		Water vapor present	Water vapor removed	Water vapor and carbon dioxide removed	Carbon dioxide present	Carbon dioxide removed	Mixture of gases of columns 4 and 1	Mixture of gases of columns 6 and 1	Mixture of equal parts of gases of columns 4 and 6 with water gas
	1	2	3	4	5	6	7	8	9
Moisture (H_2O) %	....	24.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon dioxide (CO_2), %	6.6	9.9	13.2	.0	41.3	.0	1.9	3.1	2.6
Illuminants, %	.2	.3	.4	.4	.3	.5	.3	.4	.3
Carbon monoxide (CO), %	38.0	32.1	42.8	49.4	.0	.0	46.2	17.8	29.9
Hydrogen (H_2), %	50.0	0.0	0.0	0.0	19.3	32.9	14.3	40.9	29.5
Methane (CH_4), %	1.2	26.8	35.6	41.0	32.6	55.6	29.6	30.1	29.9
Nitrogen (N_2), %	4.0	6.0	8.0	9.2	6.5	11.0	7.7	7.7	7.8
Total, per cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Calorific value B. t. u. per cu. ft.	300	379	504	580	397	676	500	500	500
Calculated specific gravity at 60°f	0.5498	....	0.8930	0.7977	0.8872	0.4419	0.7270	0.4927	0.5931
Volume yield per 1,000 cu. ft. of water gas	1000	666	500+	434+	620	364	517.7	518.3	521
Thermal efficiency, B. t. u. of residue gas / B. t. u. of water gas	....	84.0	84.0	84.0	82.0	82.0	86.5	86.4	86.4

Paraffins

$$2CH_3OH=CH_3.O.CH_3+H_2O \quad (5)$$
Methyl alcohol Methyl ether

$$2CO+5H_2=C_2H_6+2H_2O \quad (6)$$
$$4CO+3H_2=C_2H_6+2CO_2 \quad (7)$$
$$3CO+7H_2=C_3H_8+3H_2O \quad (8)$$
$$6CO+4H_2=C_3H_8+3CO_2 \quad (9)$$
$$4CO+9H_2=C_4H_{10}+4H_2O \quad (10)$$
$$8CO+5H_2=C_4H_{10}+4CO_2 \quad (11)$$

Reactions (6)—(11) occur at atmospheric pressure in the presence of certain catalysts at 200 to 270°C. (392 to 518°F.)

Olefins

$$2CO+4H_2=C_2H_4+2H_2O \quad (12)$$
$$4CO+2H_2=C_2H_4+2CO_2 \quad (13)$$
$$3CO+6H_2=C_3H_6+3H_2O \quad (14)$$
$$6CO+3H_2=C_3H_6+3CO_2 \quad (15)$$
$$4CO+8H_2=C_4H_8+4H_2O \quad (16)$$
$$8CO+4H_2=C_4H_8+4CO_2 \quad (17)$$

One catalyst that has proved to be satisfactory comprises a mixture of the partly reduced oxides of manganese, copper, and cobalt.

In the first group of equations (1) and (2) are of particular interest; they represent different types of reactions. In equation 1 the water formed with the methane can be readily separated from the latter by condensation; whereas in equation 2, CO_2, which is not so readily removed, is formed. With proper control over these reactions in practice in the manufacture of methane-carbureted water gas, it would be possible to vary the density and the CO:H_2 ratio of the finished gas over a wide range (see Table 1). The conditions under which these reactions take place are discussed in the references cited.

Equations 6 to 17 typify a similar double set of reactions whereby paraffin gases or olefin gases may be prepared. The mechanism of these reactions is not so simple as is indicated by the equations, but the net results are as shown. Smith[2], using a particular catalyst, concludes that most of the O_2 appears in the products as H_2O, and that the ratio H_2O/CO_2 increases rapidly with rising temperature. It is possible to control, within certain limits, the nature of the hydrocarbons produced with respect to their molecular weight by the choice of catalyst and by controlling temperature and space velocities. On the laboratory scale it apparently is possible to convert water gas into hydrocarbons that either are entirely gaseous under normal conditions of temperature and pressure, or else contain an appreciable amount of condensable products that can be incorporated in motor fuel. This can be done in a given type of reaction chamber, at atmospheric pressure, and at temperatures between 200 and 300°C. (392 and 572°F.) when employing the same or a different catalyst in each case. The question arises: To what extent will it be possible to employ a combination system whereby a gas company can produce motor fuel during off-peak periods and meet its own enricher requirements at other times?

Equations 4 and 5 indicate the reactions whereby water gas can in part be converted into methyl alcohol and then into methyl ether, which under certain conditions can be used as a carbureting material without cracking. These reactions can be caused to occur in the presence of particular catalysts under pressure greater than atmospheric. Of particular significance is the fact that the alcohol can be stored and subsequent-

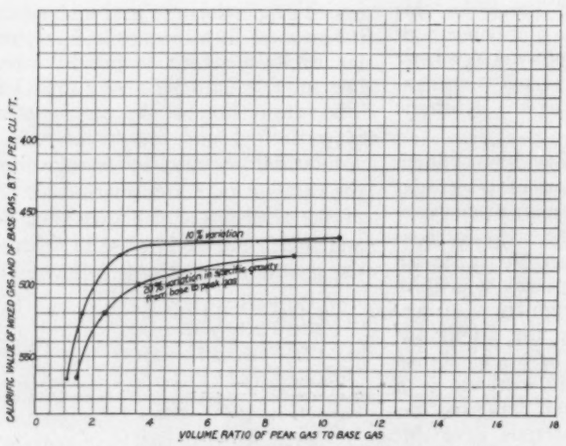

CALORIFIC VALUE OF MIXED GAS AND OF BASE GAS, B.T.U. PER CU. FT.
VOLUME RATIO OF PEAK GAS TO BASE GAS
10% variation
20% variation in specific gravity from base to peak gas

Figure 2—Effect of changes in calorific value upon the ratio of maximum possible production of peak gas to base gas. (Base gas comprises coal gas or mixed coal gas and producer gas; carburetted water gas is used in making peak gas.)

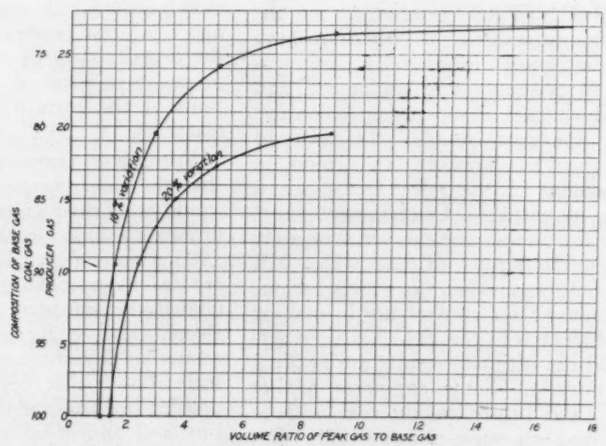


Figure 3.—Composition of base gas (mixed coal gas and producer gas) for various ratios of peak gas (mixed coal gas, blue gas and carburetted water gas) to base gas. The specific gravity of peak gas varying 10 and 20 per cent from that of base gas.

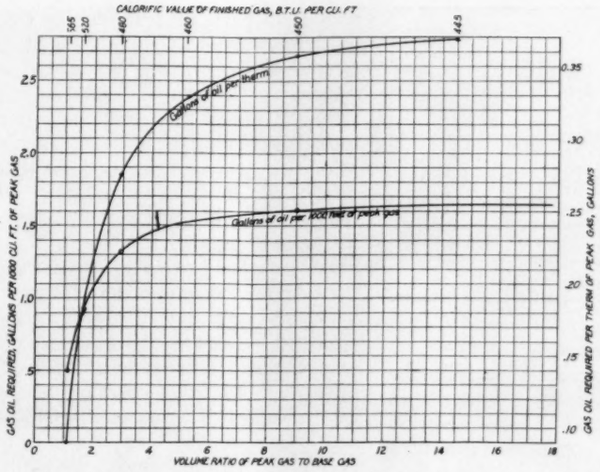

CALORIFIC VALUE OF FINISHED GAS, B.T.U. PER CU. FT.
GAS OIL REQUIRED, GALLONS PER 1000 CU. FT. OF PEAK GAS
GAS OIL REQUIRED PER THERM OF PEAK GAS, GALLONS
Gallons of oil per therm
Gallons of oil per 100 cu. ft. of peak gas
VOLUME RATIO OF PEAK GAS TO BASE GAS

Figure 4—Oil consumption in production of peak gas, 10 per cent variation in specific gravity above that of base gas.

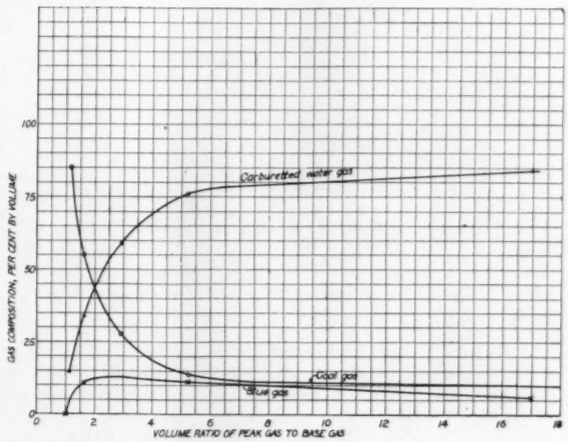


Figure 5—Composition of peak gas, 10 per cent variation in specific gravity above that of base gas.

ly converted, as required, into the ether by catalytic means. In considering the possibility of using methyl ether for enriching gas its marked solubility in water must be taken into account; 1 volume of water absorbs 39 volumes of the gas at 64°F. The economics of alcohol (methanol) production has been discussed by Fieldner.[3]

Thermal Efficiency: In the reactions yielding synthetic hydrocarbons, heat is evolved in quantities sufficient to make the process self-sustaining. Therefore, the conversion efficiency is expressed substantially by the ratio of the heats of combustion of the products to those of the reactants. Thus in equation 6 the efficiency is

$$\frac{1{,}778 \times 100}{(2\times 323)+(5\times 325)} = 78.3 \text{ per cent.}$$

Similar figures can readily be calculated for the other equations. However, in reference to equations 4 and 5 it should be remembered that higher pressures are required for a high-percentage conversion, therefore the actual thermal efficiency of production of methyl ether from water gas will be less than is indicated by the heat of combustion ratios.

Equilibrium is reached before all of the CO and H_2 reacts according to the equations, but conditions can be so adjusted that a high percentage of the latter gases will react to form hydrocarbons.

Application: If the reactions indicated by the equations, and others similar to them, can be controlled satisfactorily on a working scale, a means is at hand for carbureting gas without the use of a petroleum product. Furthermore, it would be possible for gas companies to produce motor fuel during certain periods of the year as well as enriched gas. The possibilities in the development of such a combination process are of important interest to the manufactured-gas industry. Progress in this field might remove much of the doubt which exists in the minds of many engineers regarding the future trend in the use of certain types of gas-making equipment.

The limits to the possible usefulness of such a process are defined by the thermal efficiencies of conversion and the yields. The former are close to 80 per cent; the latter may be computed from the equations. For example: the theoretical yield (100 per cent conversion) according to equation 1 is 1 volume of CH_4 from 4 volumes of reactants 25 per cent. Similarly in equation 8, one volume of gaseous C_3H_8 is obtained from 10 volumes of reactants.

Factors governing the use and production of synthetic hydrocarbons in the gas industry.

Off-Peak Gas: The fact that gas companies maintain idle gas-generating apparatus throughout a large part of the year in order to meet peak demands occuring during the remaining part has an important bearing upon the practicability of making synthetic hydrocarbons at city gas plants. The variation in demand for gas is not the same in all cities, and therefore this factor must be considered separately for different cases. Figure 1 shows graphically the relative monthly "send-out" of gas for a number of our large cities for one year. It will be observed that the peak demand is usually in December and January, and the minimum send-out is in the summer months. The exception to this, as shown, is a convention and resort city. The actual ratio of maximum to minimum day send-out is not shown in this figure; it may be 3:1 to 6:1. Thus a company may have 20 per cent of its generating capacity idle 90 per cent of the time and 50 per cent idle 75 per cent of the time, and so on. Water-gas equipment, however, might be utilized continuously upon development of a process for the synthesis of hydrocarbons.

The cost of off-peak gas is less than that of peak gas by an amount which will vary according to conditions. Fixed charges, superintendence, and some other items are reduced by continuous operation; this fact should be considered in any computation of possible results obtainable by new processes.

Many engineers have studied the problems relating to the flexibility of operation and the necessity of producing peak gas with low-priced generating equipment. A solution commonly suggested comprises essentially the following requirements:

1. The production of gas having a low calorific value—plus or minus 480, (approximately) B.t.u. per cubic foot.
2. The mixing of coal gas (or mixed coal gas and producer gas) as a base gas with water gas variously carbureted, in supplying peak gas.
3. The adjustment of proportions in the mixtures to maintain the specific gravity of the gas within definite limits of variation—that is, 10 to 20 per cent variation.

In one of these estimates the ratio of base gas to the maximum volume of peak gas which can be produced decreases as the calorific standard is lowered; in other words, the percentage amount of carbureted gas in the finished product increases with a lowering of standards. This relation is shown in Figure 2. The composition of base gas corresponding to the different ratios is shown in Figure 3: the oil consumption, (calculated on the basis of 1 gallon yielding 100,000 B.t.u. as gas) per M cubic feet of peak gas is shown in Figure 4. Figure 5 shows graphically the composition of peak gas-mixed gas.

These figures show that even if the gas industry adopts lower standards and makes mixed peak gas, the oil consumption per M cubic feet of the gas will increase with increasing ratios of peak to base gas. In certain instances, this ratio may increase because of higher sales of gas for house-heating. Although there may be many points of advantage

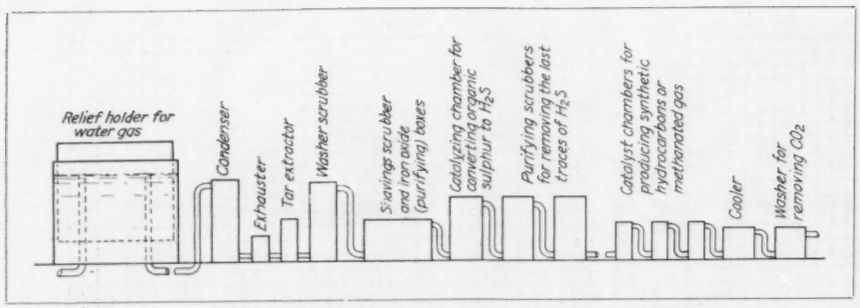

Relief holder for water gas
Condenser
Exhauster
Tar extractor
Washer scrubber
Shavings scrubber and iron oxide (purifying) boxes
Catalyzing chamber for converting organic sulphur to H_2S
Purifying scrubbers for removing the last traces of H_2S
Catalyst chambers for producing synthetic hydrocarbons or methanated gas
Cooler
Washer for removing CO_2

Figure 6—Hypothetical flow diagram, not drawn to scale

in such schemes of operating, the fact remains that the industry is still dependent upon gas oil in the making of peak gas, even though it may be higher priced and inferior in quality in the future. In calling attention to the possibility of freeing the industry from dependence upon gas oil it is recognized that further progress in investigations in this field may show that for many years the logical and economical procedure in making gas will comprise methods already suggested, using gas oil.

Value of Synthetic Hydrocarbons

The actual over-all value of synthetic hydrocarbons to a producing gas company is not clearly defined because it is dependent upon factors not yet evaluated. However, certain comparisons can be made which will aid in assigning an approximate relative value. For example: It is known that 1 gallon of gas oil usually yields 100,000 B.t.u. to the gas (62.5 cubic feet of 1,600-B.t.u. oil gas), therefore synthetic hydrocarbons of the same calorific value have a minimum commercial value bearing a definite relation to the price of gas oil. Thus, with gas oil at 7 cents per gallon the minimum value of such hydrocarbon gas is 7 cents per 100,000 B.t.u.; the value of recovered liquid by-products from the gasification of oil is ignored in this comparison. When high-boiling hydrocarbons suitable for use in motor fuels are made their value is comparable to the prevailing price of other motor fuels and in the near future may be 7 to 20 cents per 100,000 B.t.u. (9.8 to 28.0 cents per gallon of 140,000-B.t.u. motor fuel) according to prevailing market conditions and methods of disposal. The indications are that both gaseous and readily condensable hydrocarbons will be made simultaneously, under which condition the true value of the hydrocarbons will depend upon the proportion of each produced and the prevailing market price of gas oil and motor fuel.

Presumably, enriched water gas made by the use of synthetic hydrocarbons will be free from gum-forming and resin-forming constituents, as well as from tar fog and naphthalene. Furthermore, it may be possible to change at will the calorific value of the mixture used to carburet water gas, and the specific gravity of the enriched gas can be maintained within limits such that it can be mixed in almost all proportions with coal gas and used satisfactorily as city gas. These and similar factors such as the relative costs of equipment and operation must be considered in evaluating synthetic hydrocarbons. It is possible that ultimately they will be worth more to the gas industry than is indicated by their fuel values (heats of combustion).

Data required for accurate computation of the usefulness of synthetic hydrocarbon processes in the gas industry.

Much headway has been made in the laboratory studies of the synthesis of hydrocarbons from H_2 and CO; but it seems that only as a result of additional research and of experiments conducted on a larger scale can one compute the usefulness of such processes in making gas. Many questions of primary importance remain unanswered; some of these are discussed separately in the following pages:

Purification of Raw Gas (Water Gas): When using the catalysts which have thus far been proposed or found satisfactory for promoting the synthesis of hydrocarbons from water gas, it is necessary to remove all traces of sulphur compounds and of certain other impurities from the raw gas. Sulphur compounds in particular poison the catalysts even when present in the gas as traces. In the production of city gas it is not customary to remove organic sulphur, although means have been suggested and used for removing a large part of it. Working processes are said to be inadequate for removing the traces of sulphur which were hitherto unimportant. It has been suggested that the organic sulphur compounds be converted into H_2S by catalytic reactions at elevated temperatures, and that the H_2S formed be removed by passing the gas through iron oxide purifying material and subsequently through a scrubber contacting an alkaline solution. The questions which arise are: Is this the best solution of the problem? Is it industrially satisfactory? What are the items of cost involved and the total cost of purifying water gas of average sulphur content? What additional ground area is required? Should an attempt be made to recover free sulphur, and if so, what disposal can be made of it? Can the process be made self-sustaining? What equipment and investment is necessary for a gas plant of unit capacity?

Catalysts: For the production of methane according to reactions typified by equations 1 and 2, reduced finely divided nickel, thorium and nickel, or similar materials are usually considered. In the production of the higher hydrocarbons and methane a reduced or partly reduced mixture of the precipitated oxides or manganese, cobalt, and copper has been used. All of these materials are readily poisoned by sulphur compounds, are prepared only by a skilled chemist, and are expensive. Is it possible to produce a catalyst which is inexpensive, readily obtainable, and not easily poisoned by sulphur; one which will eliminate the necessity of removing organic sulphur compounds from the gas? Further research should throw light on this matter.

(Continued on Page 43)

Table 2.—Relative costs of purified water gas and enriched water gas—500 B. t. u. per cubic foot.

Cost of purified water gas in the holder—(Calorific value 300 B. t. u. per cubic foot)	Computed comparative costs of methanated and carbureted water gas relative to the cost of water gas			
	Methanated gas (500 B. t. u. per cubic foot). Yield of 518 cubic feet per M cu. ft. of water gas	Carbureted water gas (500 B. t. u. per cubic foot) using 2.46 gallons of gas oil per M cu. ft.		
		Gas oil at 7 cents gallon	Gas oil at 10 cents gallon	Gas oil at 15 cents gallon
Cents per M cu. ft.	Cents per M cu. ft.	Cents per M cu. ft.	Cents per M cu. ft.	Cents per M cu. ft.
16	30.9	30.76	38.14	50.44
17	32.8	31.60	38.98	51.28
18	34.7	32.44	39.82	52.12
19	36.7	33.29	40.67	52.97
20	38.6	34.14	41.52	53.82
21	40.5	34.99	42.37	54.67
22	42.5	35.83	43.21	55.51
23	44.4	36.67	44.05	56.35
24	46.3	37.52	44.90	57.20
25	48.3	38.37	45.75	58.05
26	50.2	39.22	46.60	58.90

NOTE: In each case the cost of enriched gas is based upon the cost of water gas as shown in the corresponding line of column 1: no allowance is made for the cost of the enriching operation and for differences in fixed charges.

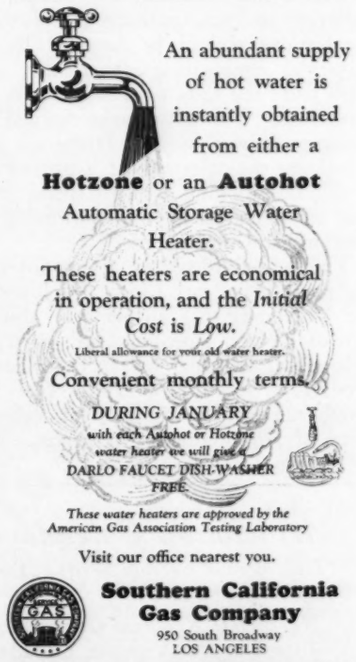
This water heater window display at the Los Angeles headquarters offices of the Southern California Gas Company tied in with newspaper advertising illustrated in the sample reproduced on this page

A January Water Heater Campaign Which Got Results

By H. E. DAVIDSON
Southern California Gas Company

THE Southern California Gas Company's initial effort in its 1929 appliance sales program was a water heater campaign during the month of January. Although water heaters are not ordinarily featured during this month, they were selected in this instance because they offer greater campaign possibilities than any other gas appliance, considering both volume of sales and increase in load, and would therefore be most likely to make the first drive of the year a success. Two makes of automatic storage type heaters were featured throughout the campaign.

No special discounts or terms were offered during the month, and only the usual trade-in allowance of 10 per cent for the old water heater was allowed. As a special inducement, however, a faucet type dishwasher was given away with each heater sold. This dishwasher, consisting of a wire dish rack and a hose to be connected to the hot water faucet, enables the operator to first wash the dishes with hot soapy water and then rinse them with hot clear water. As a premium with water heaters, it conforms to good practice in that it encourages the use of the appliance with which it is given, just as does a kitchen clock to complete the time-temperature idea or a whole meal cooking set with an oven-regulated range.


Instant Hot Water
An abundant supply of hot water is instantly obtained from either a
Hotzone or an Autohot
Automatic Storage Water Heater.
These heaters are economical in operation, and the Initial Cost is Low.
Liberal allowance for your old water heater.
Convenient monthly terms.
DURING JANUARY
with each Autohot or Hotzone water heater we will give a
DARLO FAUCET DISH-WASHER FREE
These water heaters are approved by the American Gas Association Testing Laboratory
Visit our office nearest you.
Southern California Gas Company
950 South Broadway
LOS ANGELES

Newspaper copy used during Southern California Gas Company drive on water heaters

In addition to this inducement to customers, a prize was offered to the salesman in each territorial division making the highest score in selling water heaters during the month. In computing this score, 15-gallon heaters were rated as one point, 20-gallon as two points, 30-gallon as three points, and 45-gallon as five points. It was thought fairer to award a prize to the high salesman in each of the four divisions represented in the contest rather than first, second and third prizes to the three highest men throughout the system, as under the former plan each salesman is in competition with others under more nearly similar conditions. That this plan is sound is shown by the fact that in a subsequent range campaign, with one exception, the prize in each division was won by a different man from the one who had led in the water heater contest.

The larger newspaper advertisements used in the campaign, 3 column by 12 inches in size, featured the picture of a large faucet with a full stream of running water and clouds of steam. This illustration told the story of the automatic water heater fom the customer's viewpoint at a glance—an *adequate* supply of *hot* water at the *turn* of a faucet. It is interesting to note in this regard that the automatic water heater is the

(Continued on Page 48)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California

A Department Conducted by Clifford Johnstone, Executive Secretary

Technical Men *in* Profitable March 1 Session

UNDER the leadership of Van E. Britton, Chairman of the Technical Section, a very interesting meeting of that Section was held in Los Angeles on March 21.

Through the courtesy of the Los Angeles Gas and Electric Corporation, the assembly room of the New Business Department was made available for the morning session, and luncheon was served in the Auditorium wherein the meeting continued after the luncheon. This luncheon was a decided success, although some anxious moments were lived through by Bill Henderson and the cafeteria management because the large number attending completely exhausted the available supply of chicken pie, and it was only because of the speed and flexibility of that peerless fuel, gas, that the very high load factor was satisfied.

The purpose of the conference was to determine the status of the year's work of the Technical Section and to corrolate and give an impetus to studies engaging the attention of the several committees.

The morning session was devoted largely to a discussion of external corrosion, being led by Dozier Finley, chairman of the External Corrosion Subcommittee of the Distribution Committee. Mr. Finley told of the present status of work being done on this problem by the Bureau of Standards, the American Gas Association and the American Petroleum Institute, and reiterated the recommendation of this committee last year that the Association sponsor some definite research in connection with the laboratory of one of the Western technical schools. The recommendation was held in abeyance pending the preparation of a definite research program and a determination of its cost. The matter will again come up at the Victoria meeting and it is possible that the Board of Directors may be asked to make an appropriation to cover the cost of this work. The general discussion brought out that Pacific Coast gas companies have probably done more in corrosion research than have Eastern companies, this being occasioned no doubt by the greater prevalence of corrosive soils in the West. It was generally agreed that as yet no completely satisfactory protective measures have been devised. Many of those present evinced a great interest in metallic coatings either of chronium or lead, and A. F. Bridge, Southern Counties Gas Company, stated that his company was laying a great deal of copper pipe for mains and services where diameters do not exceed two inches.

The corrosion discussion was followed by reports from other sub-committees of the Distribution Committee, and by J. E. Kelley reporting for the sub-committees of the Production Committee. The work of many of these sub-committees is well advanced and many of the studies promise to be of great value and interest to the industry.

Following the luncheon, Lee Holtz, general superintendent of the Southern California Gas Company, delivered an address, "The Engineering Aspect of Industrial Gas Sales," printed elsewhere in this issue of *Western Gas*. In his address Mr. Holtz discussed organization matters tending to improve the contact with industrial customers and advocated a plan whereby the design, installation and maintenance of industrial installations should be handled by an industrial engineering department separate from the sales or new business departments. The advantages claimed for this organization by Mr. Holtz are that it relieves the salesman of a great mass of detail, allowing him to spend more time on actual selling and improving his position with customers.

This was followed by a very interesting paper by Prof. Lloyd T. Jones of the University of California on the design of tapered pipe lines for gas transmission. This paper will be published in the May issue of *Western Gas* and briefly advocates the gradual enlargement of pipe diameter from the supply to the delivering end. Mr. Jones claims for this, a considerable increase in delivery capacity and a saving in cost, due to a fewer number of compressor stations and the installation of lighter pipe. Due to the mathematical nature of Mr. Jones' report, discussion was limited, although it was evident from such discussion as took place that some of those present were not in entire agreement with the conclusions. Mr. Britton invited Mr. Jones to attend the Del Monte Convention and promised that the matter would again be open for discussion at that time.

Then followed a report by William Moeller, Jr., chairman of the Natural Gas Committee, who outlined the very ambitious program of his committee. Messrs. Elting Henderson, Mr. R. Thompson and F. A. Hough, chairman respectively of the sub-committees on Compressor Stations, Transmission Pipelines, and Natural Gas Measurement, discussed their work at some length and it may be confidently predicted that natural gas technique will be adequately treated in this year's work.

Association Calendar

Commercial Section Session, Los Angeles, April 8, 1929.

Northwest Regional Conference—June 7 and 8, Victoria, Canada.

Annual Convention—Del Monte, September 10 to 13, 1929.

Arizona Convention Now in Session

AS this issue of *Western Gas* goes to press the annual convention of the Arizona Utilities Association is taking place in Tucson, Arizona. As is customary with this extremely energetic association, places have been provided on the program for representatives of the Pacific Coast Gas Association and the Pacific Coast Electrical Association. The Gas Association will be represented by Clyde H. Potter, chairman of its Commercial Section, who will deliver an address on the necessity and reward for an aggressive sales policy, and by Capt. A. E. Higgins, field representative of the American Gas Association, who will talk on the rapid development of the Blue Star Home and its influence on modern building.

Other gas men from the Coast who are attending this Convention are Harry L. Masser, vice-president of the Los Angeles Gas and Electric Corporation; N. R. McKee, purchasing agent of the Southern Counties Gas Company; W.

M. Thompson, president of the Reliance Manufacturing Company; Frank Packer of the Welsbach Company, Clifford Johnstone, executive secretary of the Pacific Coast Gas Association, and W. D. Dickey, manager of the Pacific Meter Works.

Conference of Commercial Section, April 8

Clyde H. Potter, chairman of the Commercial Section, has called a conference of the Section to be held in Los Angeles on April 8. This meeting is for the purpose of ascertaining the progress of committee work and of stimulating committees to further effort in preparation for the Convention program.

A special meeting will be called for the Committee on Ordinances which is co-operating with the Building Committee of the California Development Association, and on the morning of April 9 a special conference of Advertising and New Business executives will be held to consider plans for cooperative advertising.

This luncheon conference will be the last gathering of the Commercial Section in California before the Convention at Del Monte. The program for the meeting is as follows:

LUNCHEON 12:15

"Heat Treating Furnaces—Illustrated" E. M. DeRemer, Southern California Gas Company.

"Progress in Hotel and Restaurant Sales," D. L. Leahy, Southern Counties Gas Company.

Reports of Committees and Discussion of these Reports.

"Everything Depends on the Sales Department," F. H. Bivens, Vice President, Pacific Coast Gas Association.

Appliance Manufacturers Directory Out

The Directory of the Gas Appliance Manufacturers, revised and republished by the executive secretary at the request of the Commercial Section, was mailed to Association members late last month. Its arrangement has been changed somewhat from the first edition and there has been added a table showing communities served with gas in British Columbia, Washington, Oregon, California, Arizona, Nevada and Idaho. For each of these communities is shown the average B.t.u., specific gravity, and delivery pressure of the gas and the name of the gas company serving it. A free copy of this Directory has been mailed to each member of the Association. Additional copies con be purchased from 50c each from the secretary's office.

Victoria Meeting

Plans for the Northern Regional Conference to be held at the Empress Hotel at Victoria, B. C. on June 7 and 8, are progressing rapidly and complete announcement of the program will be possible in the May issue of *Western Gas*. Due to the great interest being displayed in this conference it is expected that it will eclipse even the very successful Northwest meetings of the past two years, and all Northwest members of the Association should plan to attend it.

W. D. Dickey to Manage Del Monte Convention

The President has appointed W. D. Dickey, manager of the Pacific Meter Works, as General Chairman of the 1929 Convention which is to be held at Del Monte, September 10 to 13 inclusive.

Bill Dickey is an experienced conventioneer and is already laying plans for a convention organized for the benefit of those attending, rather than for the benefit of the officers and Association officials as is the usual practice.

Committee Notes

Archer O. Leech, Industrial Sales Department of the Portland Gas and Coke Company, has been appointed to represent his company as a member of the Manufactured Gas Industrial Sales Committee.

C. R. Miller, chairman of the Committee on Sales Budgets, has appointed Roy G. Munroe, gas new business manager of the Public Service Company of Colorado, Denver, as a member of his committee.

M. R. Thompson, vice-president in charge of construction for the Southern Counties Gas Company, has been appointed chairman of the committee on Natural Gas Transmission and Pipe Lines to replace F. F. Doyle, formerly of the Southern California Gas Company, who resigned the chairmanship because of the nature of his new duties with the Pacific Gas and Electric Company. Mr. Doyle, however, remains a member of this committee.

Don C. Ray, chairman of the Committee on Relations with the Public, of the Public Relations Section, announces that Jas. Lightbody, advertising manager of the British Columbia Electric Power and Gas Company, Vancouver, has accepted responsibility for making a study of Public Relations through Executive Policies, H. W. Beekman of the Pacific Gas and Electric Co., Oakland, Public Relations through Employee Contacts, and W. M. Henderson of the Los Angeles Gas and Electric Corporation, Public Relations through Service.

A. E. Holloway, chairman of the Public Relations Section, announces the acceptance by F. E. Seaver, secretary of the Los Angeles Gas and Electric Corporation, of the responsibility of managing an Essay Contest. Mr. Seaver will shortly publish the rules to be followed in this Essay Contest and the prizes to be awarded. The purpose will be to interest gas company employees in all departments in some vital problem facing the industry. Mr. Holloway also has appointed Jas. F. Pollard, division manager of the Pacific Gas and Electric Company, Valley Division, as chairman of the committee to handle the Three-Minute Public Speaking Contest at the Convention and also to manage the Public Relations Stunts Night which has become such an interesting feature of our conventions. This year there will be two Three-Minute Speaking Contests, one for men and one for women, the women's contest to be staged by the Women's Committee of the Public Relations Section under the leadership of Mrs. Ruth E. Creveling.

Engineering Aspects *of* Industrial Gas Sales

(Continued from Page 20)

We of the Southern Gas Company have in the past two years sold some $90,000 worth of high class equipment, such as nonferrous melting furnaces, core ovens, steel treating furnaces, carbottom furnaces etc., and feel that it is the finest class of equipment that can be placed on a gas company's lines. The rate applicable to this business is very substantial and from the load factor standpoint, no business can compare.

It is true that we have had plenty of rough spots to smooth off, due to the fact that we have been pioneering in southern California in this line of endeavor, but wth the assistance of a newly set up engineering and construction department, we are gradually finding our place in the scheme of things and, without question, in the very near future will be in a position to hold our own in every respect.

JOHN S. McGROARTY TO TALK AT SO. COUNTIES GAS CO. MEETING

John Steven McGroarty, author and historian, and a number of his singers and dancers from the Mission Play are scheduled to appear on the program of the monthly sales meeting of Southern Counties Gas Company on April 11. The program for the meeting will be directed by Walter G. Rich, manager of the Whittier District.

EDITORIAL

Getting the Farm Load for Gas

FOR several years the electric industry has been working on a definite program for carrying the benefits of its services to the farm. This is only one of the many evidences of enterprise among our electric brethren.

To a limited degree gas, too, has been doing things for the farm on the lines of a number of utilities, but few steps have been taken to let the public know about it. Because of the electric utilities' alertness in capitalizing their services, the term "farm electrification" has almost come to be regarded as a synonym for completely modernizing the farm.

It is not too late for the gas company to climb aboard this farm modernization bandwagon and reap the benefits in increased load and a reputation for enterprise. Let it be known, for instance, that along the transmission lines of many gas utilities are thousands of acres of well watered lands which owe their irrigation to the economical gas engine.

There is no doubt that the farm gas load will grow constantly from now on. Interconnection of gas manufacturing plants is opening up rural territory which formerly could not be reached by the manufactured gas main. Natural gas lines traverse long stretches of farm acreage to reach metropolitan centers.

One combination utility serving manufactured gas and electricity to suburban territory surrounding Chicago, the Public Service Company of Northern Illinois, is going after the farm load for gas with the same methods used for electricity. A model farm is maintained by the company. On this farm are found 125 applications for electricity, and now, with gas tied into the program, some 20 uses are found for the ideal fuel. The company expects to raise this list to 40 inside of the year. Included in the gas services are all of the domestic uses, plus gas for the forge, the incubator, stock and poultry water heaters, for heating sprouters and germinators, and other adaptations to essential farm processes.

Rural territory which is on the gas line should be opened up with the same vigor as the larger markets represented in a community. Gas companies with such territory on their lines will see the wisdom of maintaining a staff of "agricultural engineers" to develop and service the farm gas load.

Even When the Public Is Sold, There are Problems

A RECENT survey of new apartment dwellings erected in the city of Los Angeles during the year 1928 reveals that of the 131 such structures costing $20,000 or more built in that year, approximately 95 per cent specified gas fuel in one form or another for heat. This is a decided reversal from the condition found even five years ago, when gas could have claimed perhaps 50 per cent of the house-heating load in this class of apartment.

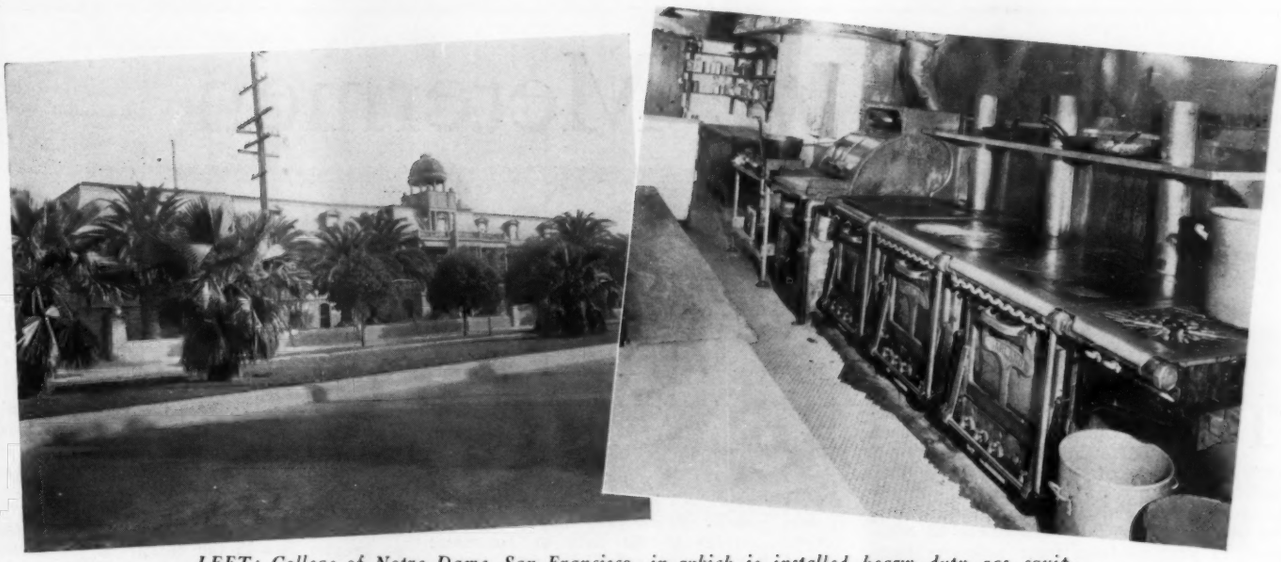
In Los Angeles, as in many another market, a combination of abundant gas supply, rate structure, and aggressive salesmanship of house-heating by utilities and dealers has made gas the dominating fuel for domestic heat. The public is sold on gas for this purpose.

Thus there arises a situation which possibly is not generally appreciated in the selling of house-heating. Dealers in gas heating appliances find their real competition not from rival fuels but from other gas heating appliances. The tendency to shave costs, to economize on every corner in heating installations, with the constant temptation to specify units of insufficient capacity, is ever present—more so than when a sceptical public must be won over to the merits of gas fuel.

This evil would cease abruptly if those most directly concerned—the manufacturers and dealers in heating equipment—would recognize that in a market where other gas equipment dealers are the big competitive factor, a failure of their own gas equipment reflects directly upon that equipment, rather than upon the fuel used. Manufacturers and dealers who are looking to their future in such a competitive market will encourage homeowners and speculative builders alike to let them put in adequate heating equipment, rightly installed.

The gas company in such a market, with its public converted to house-heating by gas, should not miss the fact that the buyer's preference in this day and age is more exacting and more fickle than ever before.

Only by rendering complete heating satisfaction can gas hold the heating load, and this it can only do through adequate, efficient appliances. Because of its influence with architects, appliance manufacturers, dealers, and the public generally, the gas company can insist that only such equipment go onto its lines.



LEFT: College of Notre Dame, San Francisco, in which is installed heavy duty gas equipment. RIGHT : Gas range equipment in the kitchen of the Victoria Hotel, San Francisco

Overall Economy Gives Gas *the* Advantage *in* Hotel *and* Restaurant Sales

By I. L. HECKINGER
Pacific Gas and Electric Company

IN meeting oil and coal competition in hotels and restaurants it is usually well to make a cost analysis and comparison of the cost of fuel and repairs to ranges and other equipment for both gas and oil or coal. In many cases it is easy to point out that the over-all operating cost of an all-gas installation is the same or less than the overall cost of other fuels. A brief description of several jobs recently converted from oil to manufactured gas on the Pacific Gas and Electric Company system may be of interest in illustrating that other factors than just fuel cost alone must be considered.

I. L. Heckinger

The Victoria Hotel in San Francisco was using an 8-foot oil range. This range was removed and in its place were installed three sections of heavy duty gas range equipment. The average gas bill at this hotel for auxiliary equipment, such as coffee urns, etc., was $41.42. The cost analysis on this page shows clearly the procedure used in arriving at the estimated cost of complete gas service.

Since installing the gas ranges, they have discontinued the use of their oven and all auxiliary equipment and are now doing all their work on these ranges. The Victoria Hotel's average bill is now $55.00 a month. The combined cost of the oil ranges and gas ovens for fuel alone was $81.02 per month. Now the ranges alone use $55.00 worth. This is $13.58 more than the oil cost, but as the range ovens are used for baking and the regular gas bake oven discontinued there is an actual saving of $26.02 in favor of gas alone.

The Richelieu Hotel, Van Ness Avenue and Geary Street, San Francisco, removed the oil range and installed three sections of gas ranges. The average gas bill for auxiliary equipment was $16.62, and since installing the gas ranges and doing all the cooking with gas, the average bill is $84.16. The cost of fuel oil for operating the oil ranges was $50.00 per month; thus it is costing $17.54 more per month to cook with gas than with oil, figuring fuel cost only.

The College of Notre Dame of San Francisco was using coal for heavy duty cooking, but just recently removed the

(Continued on Page 42)

Estimate of Cost of Complete Gas Service

1 oven 6:30 A.M. to 8:00 A.M.—1½ hrs @ 75 cu. ft. per hr. per oven	110 cu. ft. per day
3 ovens 8:00 A.M. to 11:30 A.M.—3½ hrs @ 75 cu. ft. per hr. per oven	790 cu. ft. per day
3 ovens 4:00 P.M. to 5:30 P.M.—1½ hrs. @ 75 cu. ft. per hr. per oven	340 cu. ft. per day
Total Oven Consumption	1240 cu. ft. per day
2 tops 6:00 A.M. to 8:00 A.M.—2 hrs. @ 90 cu. ft. per hr. per top	360 cu. ft. per day
3 tops 8:00 A.M. to 1 P.M.—5 hrs. @ 90 cu. ft. per hr. per top	1350 cu. ft. per day
3 tops 4:00 P.M. to 7:30 P.M.—3½ hrs. @ 90 cu. ft. per hr. per top	945 cu. ft. per day
Total Top Consumption	2,655 cu. ft. per day
Total daily consumption for tops and ovens	3,895 cu. ft.
Total monthly consumption for tops and ovens	116,850 cu. ft.
Present average gas consumption per month	49 400 cu. ft.
Estimated consumption of ranges per month	116,850 cu. ft.
Total estimated gas consumption per month	166,250 cu. ft.
166,250 cu. ft. of gas @ $.767 per thousand—$127.50 per month.	

Estimate of Present Oil Consumption of Ranges

6:00 A.M. to 1:30 P.M.—7½ hrs. @ 4 gal. oil per hour	30 gals. per day
4:00 P.M. to 7:30 P.M.—3½ hrs @ 4 gal. oil per hour	14 gals. per day
Total daily oil consumption	44 gals. per day
Total monthly oil consumption	1320 gals.
1320 gallons oil @ 3c per gallon (or $1.24 per barrel)	$ 39.60 per month
Estimated cost of elec. current necesary to pump oil from tank to range	8.00 per month
Cost of repairs to oil ranges according to hotel figures	30.00 per month
Present average gas bill	41.42 per month
Total estimated cost of present operation	$119.02
Estimated difference in cost—$8.49 per month in favor of oil and gas.	

With *the* Metermen

Automatic Regulation Keeps Pace *with the* Industry's Rapid Advance

By WILLIAM S. WALDRIP
Chief Engineer,
Neilan, Schumacher & Company *

THE advances in the oil and gas industry in the past few years have been astounding in many respects, particularly in the accuracy and precision with which every process is performed in the handling of oil and gas. The ever increasing demands from the consumers of commodities derived from these processes have forced the oil and gas companies to place correspondingly unbelievable demands upon their equipment. Improved equipment has necessitated great precision in its control in order that the maximum results of which it is capable be obtained continuously under widely varying conditions, much the same as modern traffic conditions require the guidance of an ever-vigilant automatic director —one that never becomes weary or partial in the performance of its duty nor demands a weekly pay check in return for work which it does just as efficiently as man.

Great strides in the field of automatic control have accompanied the new era in the industry. It is now possible to hold pressures, temperatures, liquid levels, rates of flow, etc., with accuracy that only the dreamer of a few years ago would have dared to imagine. It is to a part of this field—that of pressure regulation that this paper is devoted.

The increased demands for improved regulation have brought with them a great many types and styles of devices. We will cover in a general way the standardized types of regulators now in common use. In order to see the whole picture clearly let us assume that we have a pipeline flowing a given volume of fluid at a definite pressure and that we wish to utilize the contents at some lower and definitely predetermined pressure. It is evident that we must put into this pipeline some restriction so that when the fluid on the upstream side of this restriction tries to equalize its pressure with that on the downstream side the resultant velocity increase across the restriction will be sufficient to cause a loss of energy which will result in the desired reduction of pressure. This is the simplest form of pressure reducing regulator and may consist of any sort of restriction such as a globe valve. If we desire, however, to change the volume of fluid passing the restriction without changing the upstream or downstream pressure it is necessary to change the size of the restriction in order that the velocity remain a constant. On the other hand, if we wish to change the upstream pressure and yet have the volume and downstream pressure remain constant, it is necessary to change the restriction so that the velocity will be altered sufficiently to cause either a lesser or greater loss in the energy of the incoming fluid. This will again result in the desired reduction in pressure. It may be seen readily that if either, or both, of these conditions vary, there is a need for some automatic means of adjusting the restriction to the proper degree for each change; therefore, what is known as the regulating valve came into use.

The most common of the earlier types were the direct acting weight-and-lever regulators. They operated on the principle that the controlled pressure acting on the area of a diaphragm balanced the force created by hanging a weight on a lever. Figure 1 shows this type. Any increase or decrease in the pressure on the diaphragm results in a change in the position of the main valve, or restriction, which compensates for this change. These regulators did their work in a satisfactory fashion. Demands gradually grew for a regulator which was not affected by such contingencies as a bird roosting on the end of the lever, an accidental stumbling over the lever, or moisture and later dust gumming up the fulcrum and lever with increased friction. These are only a few of the things which brought about the birth of the present-day spring-loaded regulator shown in Figure 2. This regulator presents sufficient material for a complete discussion—on its design, with the reasons for each advancing step in its construction. It is, however, essential only that we consider a few of the more vital points of design.

* Pre ented before the Southern California Meter Association, February 28, 1929.

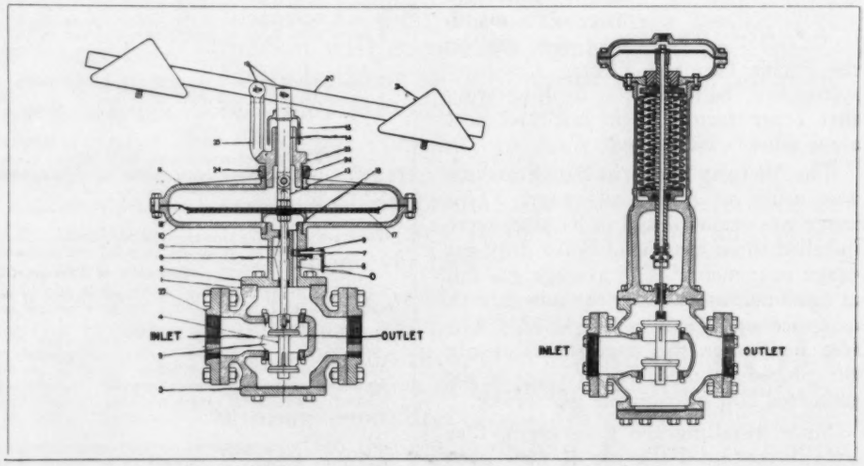


Fig. 1 *Fig. 2*

S. C. M. A. *in* Interesting Program, March 28

A GOOD turn-out of members attended the Southern California Meter Association's March 28 meeting, held at the Rio Hando Golf Club, near Downey, California. Two interesting program features were arranged, the first being a paper by Arlan E. DeBurn of Pacific Pipe and Supply Company on the "Papico Orifice Meter Flange Assembly."

Pipe in several stages of manufacture, and various fittings were arranged for display to the metermen in connection with this paper.

John C. Diehl of the Metric Metal Works, American Meter Company, Inc., who is now in Southern California for a short time, spoke informally on a number of special topics selected by those in charge of the program. His discussion touched such subjects as square root charts, some of the precautions required in establishing unit measurements in test work, and other phases of gas measurement. Mr. Diehl answered a number of questions and illustrated his remarks with blackboard diagrams.

During the business portion of the meeting following dinner, two members were voted into the organization. President B. M. Laulhere also called upon Malcolm Miller, chairman of the Entertainment Committee, for announcement of results on the blind bogey golf tournament held for members of the Association at Rio Hondo Golf Club on March 24. Twenty-four golfers entered this event, J. Simon Fluor, Sr., and Floyd Huff being the first and second prize winners. Merchandise orders, given through the courtesy of the Pacific Pipe and Supply Company, were the prizes. Mr. Fluor and President Lauhlere divided the cash sweepstakes.

Sixty-three were present at the March 28 meeting.

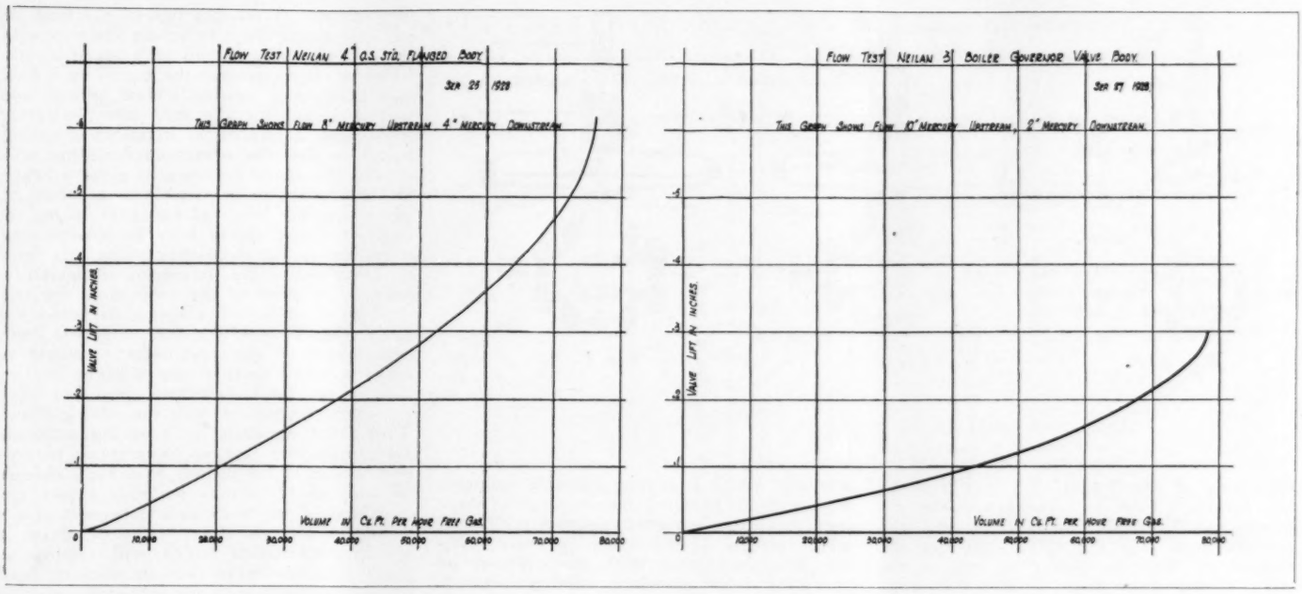

FLOW TEST NEILAN 4" G.S. STD. FLANGED BODY
THIS GRAPH SHOWS FLOW 8" MERCURY UPSTREAM 4" MERCURY DOWNSTREAM
VALVE LIFT IN INCHES
VOLUME IN CU. FT. PER HOUR FIFTY GAS
FLOW TEST NEILAN 3" BOILER GOVERNOR VALVE BODY
THIS GRAPH SHOWS FLOW 10" MERCURY UPSTREAM, 2" MERCURY DOWNSTREAM
VALVE LIFT IN INCHES
VOLUME IN CU. FT. PER HOUR FIFTY GAS

Fig. 3 *Fig. 5*

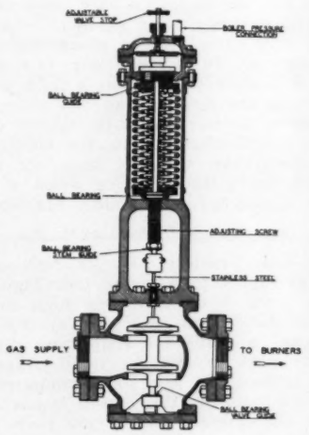


Fig. 4

To begin with the actual regulator or valve body—the most logical starting point: there are, of course, innumerable ways to design a regulating valve body. There are, to my mind, three major considerations, (1) the ability to cause as little resistance to the flow as possible in a wide open position, (2) to furnish a satisfactory restriction which will require little power to operate in keeping with good control, (3) and at the same time remain within the practical size and weight limits. All three of these points are very closely interrelated; particularly the first and last. In order to make a body with as small an energy loss as possible there are two primary considerations—velocity and curvature. Keeping the velocity to a minimum in the body is ideal, but since it is a function of the area through which the gas must pass one can readily see that the limit in this direction is the size and weight of the casting.

Curvature is a point worth just as much consideration as velocity. For every change of direction in the flow through the body there is a substantial loss in energy due to the impact of the molecules of the fluid against the curved surface. Due to their inertia, however, the path of these molecules is not easily changed; hence it is of great importance to have a design in which curves are at a minimum, except where it is desired to obtain a loss, i. e., at the the valve proper.

To build a regulator body which requires but little power to operate means that its valve must be small or else made in such a manner as to reduce the effect of a rather high velocity head upon it. To do either of these things, however, makes it necessary to lift the valve higher in order to obtain control over a wide range of volume. On the other hand, if the ports in the valve are made large the distance through which they must travel for a given range of volume is proportionately less, but it requires a considerable increase in operating power which will in some types of regulators result in throbbing or surging. Extremely large ports also add to the liability of wire drawing and cutting due to the high velocity of the fluid passing over the metal edge of the valves and seats. The logical thing to do, it seems, is to make a size of ports such that the valve is well under control of the actuating force and provide in this mechanism sufficient movement to accomplish a large change in volume easily. This is not an ironclad rule and, as will be explained later, there is one outstanding example where deviation is advantageous.

In Figure 3 a flow curve of a valve body is shown. In the design of a body it should be kept in mind that the more nearly the curve approaches a straight line, provided the line has the proper angle, the better the valve becomes. In this type of regulator the ideal flow curve is one in which each increment of valve lift has a proportionate increase in volume flowed. Valve bodies of this sort are subjected to a great many problems of control in some of which valves of special design produce highly desirable flow curves and consequent good results.

The size and weight which regulating valve bodies may be for any given pipe size has increased quite materially in the past two years. There has been more careful attention paid to proper pipe line sizes for a given volume of fluid at definite pressure drops which has created the demand for large capacity or perhaps low energy loss in valve bodies. This in turn has lead to the acceptance of larger and consequently heavier regulators in order to meet these new requirements. It must be remembered, however, that one should not attempt to build a six-inch body and disguise it with four-inch end flanges.

SUPERSTRUCTURE DESIGN

We shall next touch upon the high spots of superstructure design in the simple regulator. In our discussion of body design it was seen that reasonably high lift of the valve is an advantage; hence if we are to make use of such design we must arrange our superstructure to permit this lift with a comparatively slight change in the regulated pressure. There are four points of major importance, (1) a minimum of friction, (2) as large a diaphragm as the diaphragm material strength will permit, (3) flexible springs, and (4) the economic size limit which must conform to both reasonable cost and weight.

Friction is the greatest enemy of all regulators. It is the element that can never be balanced out. It retards the motion of the valve in opening as well as closing. Much time and effort has been, and always will be, devoted to the elimination of this destroying force. Ball bearings which roll in vertical races have been inserted to diminish the resistance to the stem connecting the diaphragm and the valve. Joints and their accompanying possibilities of misalignment have been removed from the design of regulators wherever engineering ingenuity has been able to do so.

Where stems pass through stuffing boxes they have been reduced in size and made of stainless steel to lessen friction to the lowest possible amount. There is of course less friction around small stems than around the larger ones. Packing boxes as well are being made of stainless steel to further prevent rust and sticking. These packing glands are designed so as to have several times the diameter of the stem in length, which allows a tight, leakless shut-off with very little friction.

DIAPHRAGM SIZE

The size of diaphragm which may be used on any regulator is governed by two conditions, namely: the strength of the diaphragm sheet itself and the practical economic size limit in very low pressure regulators.

It also may be seen that since the flexibility of any spring or group of springs depends upon the load they must support, the

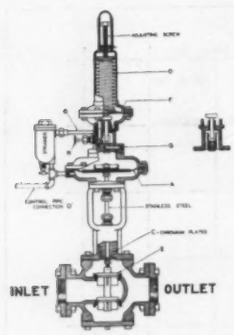


Fig. 6

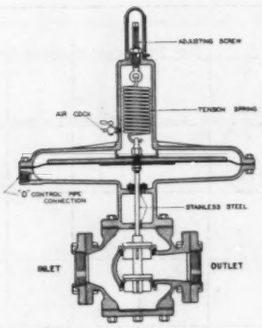


Fig. 7

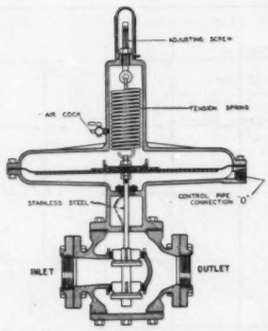


Fig. 8

increasing of diaphragm sizes will demand less flexible springs to take care of the increased total pressure of the larger diaphragm area. As the diaphragm size increases, so does the power to operate the stiffer spring grow also. It is not so easy to decide which one of these opposing demands we are to follow in the design of the perfect regulator. We know that as the area of the diaphragm and consequent force which the spring must support increases, it does so as a function of a slower ratio than the flexibility, or deflection, of the springs decreases. That is, a spring which will support a 10-pound load will deflect more for a 1-pound change of load than a spring which wll support a 100-pound load will for a 10-pound load change. Therefore, we see that the smallest possible diaphragm and weakest possible spring will theoretically give us the greatest travel per unit load change. This is not true in practice because of influencing material factors—friction and the power which is necessary to operate the valve proper. If we have a force balance between a spring and a diaphragm upon whose surface pressure is acting, then any given change in pressure will cause an unbalance to occur, of say 10 pounds. This tends to move the diaphragm so as to set up a new balance. Opposing this 10-pound force is the friction and inertia, as well as the effect of the velocity head on the valves, which must be overcome before the unbalance causes motion to take place. Let us assume that this friction, velocity effect, and inertia amount to five pounds. This leaves only five pounds of force for actual useful work, and we realize but 50 per cent of the load which the spring must support in a static condition to operate the regulator. Let us now take the same valve and double the diaphragm area so that we have 20 pounds of unbalancing force. After we again deduct our friction and inertia (i. e. 5 pounds) we have left 15 pounds or 75 per cent of the initial load change for causing useful movement of the valve against the force of the spring. In these two examples the first spring would have been more flexible. If we represent the flexibility of the first by 100 and the second by 80, then in the first case we had 50%, or 50% of 100 = 50 units of the travel. In the second we had 75%, or 75% of 80 = 60 units of travel. Consequently the second combination is 20% better for a regulator than the first.

The design of the mechanism to produce an adjustable resistance to counterbalance the force exerted upon the area of the diaphragm is one which has been no simple matter from many angles. We have, perhaps, only two alternatives—one a system of weights; the other a system of springs. At first glance the weights present one characteristic which is highly desirable, namely: they will, if mounted on frictionless bearings, move through great distance with very small increase of the operating force. We are here confronted with the problem of providing fulcrums whose friction factor is low and will remain so during long periods of service. A lever must of course be used in conjunction with the weight in order that we may gain its mechanical advantage. Otherwise, without the amplifying effect of the lever, the size of the weights take immense proportions which immediately become totally impractical. For example, to balance 80 pounds per square inch on the area of a diaphragm 7 inches in diameter would require over 3,000 pounds weight if it were applied directly. In order to bring this weight down to 100 pounds, which is undoubtedly the maximum which the regulator construction as well as field conditions permit, we are forced to use a lever at least eight feet long and of such size as to make it difficult to keep the joints from being crowded with friction. The natural thing to do, therefore, is to reduce the size of the diaphragm which, of course, cuts down the power to operate the valve as well as makes the regulator sluggish. Still another consideration is the opportunity afforded by weight-and-lever types for tampering or for accidental bending of the lever, which at once introduces friction in varying degrees, which is the constant enemy of all regulators.

PRO AND CON ON USE OF SPRINGS

Let us look over the points in favor of and against the use of springs as a means of producing a suitable resistance. It appears that they may be mounted inclosed and in such a manner as to reduce the friction to a minimum by the use of anti-friction devices. By inclosing them tampering is not invited and the hazard of accidental injury is minimized. Nevertheless a great difficulty presents itself—that is, that all springs follow Hooke's Law and their deflection is proportional to the force applied. This means that we must have a substantial pressure change on the diaphragm for a like movement of the main valve if we are to use a simple spring of small diameter and reasonable length. This quality we cannot tolerate in a regulator; therefore, we shall see if it is not possible to retain the desirable characteristics and remove the undesirable qualities of the spring system. An examination of the laws that govern the action of a coil of springs discloses the fact that by increasing the diameter and length allows us to increase the number of coils, thereby gaining in flexibility. As may be suspected, this too can readily approach sizes that are impractical. If we can lighten the load on any coil spring we may reduce the wire size and hence put more coils in a given length, which greatly increases the flexibility. This may be done by nesting several springs one within the other. We must now, however, settle upon a relation of diameter to spring length so that the maximum flexibility will result. We strive to obtain as great a range of compression as is possible in a spring of given length. We also endeavor to use as small diameter spring wire as possible and stress the spring completely to its safe limit so as to derive the maximum of flexibility, keeping in mind at the same time the fact that the flexibility of a spring decreases rapidly when stressed too near its elastic limit. The length of the adjustment necessary to make a set of springs take a given load is the key to their deflection, provided they are not stressed beyond the elastic limit. That is, if we must put a spring combination under one inch of compression to support a load of 100 pounds, then for a change in load of 10 pounds we may expect approximately one-tenth inch deflection of the springs. We, therefore, strive to obtain a spring combination which will require as much compression to take its working load as is in keeping with the economic limits of design.

It is also essential that no torsional stress be put into the spring in its compression, as this will seriously affect the load which the spring will carry with a given amount of compression. In a regulator this causes what is commonly known as a false setting; that is, as the torsion gradually relieves itself due to the working of the spring, the set pressure will change. In the construction of the regulator we may introduce a ball bearing above the adjusting screw to safeguard against torsional strains. See Figure 4.

SPECIAL REGULATION PROBLEMS

For some problems of regulation such as the gas supply to a boiler (see Figure 4), where there is an extremely high pressure on the diaphragm, the best arrangements that can be made for supporting the load do not move greatly for small changes of force as these are very small compared with the total load. In this case it is advantageous to increase the size of the ports in the valve body so as to compensate for the reduced movement. This may be done in the case of a boiler gas regulator as the inlet gas pressure is comparatively low and the effect of high velocities on large valve discs is negligible as compared to the very stable force balance possible with the use of a nest of springs in conjunction with a large diaphragm. The body has a rather flattened flow curve (see Figure 5) in contrast with the curve of a general regulator body discussed in Figure 3, and seems to die off more rapidly at the end due to the magnified proportion of ports to other areas in the body.

Some cases of high pressure regulation require great accuracy over wide ranges of volume. It is in these cases that the use of a pilot or auxiliary operated regulator becomes a decided advantag.e Figure 6 shows a small auxiliary regulator which any pressure fluctuation actuates and it relays this motion to the main valve below amplified many times. Hence we are able to have good control of the pressure.

In the installation of any regulator it is of extreme importance that the control for it be taken at the point where it is desired to maintain a constant pressure. The reason for this is very simple when analyzed. Assume a pipeline between two containers where it is desired to hold a constant back pressure on one which is some distance from the other. If the regulator is installed near

CHART NO. 1.—CAPACITY CHART FOR SELECTING BOILER GAS REGULATORS.

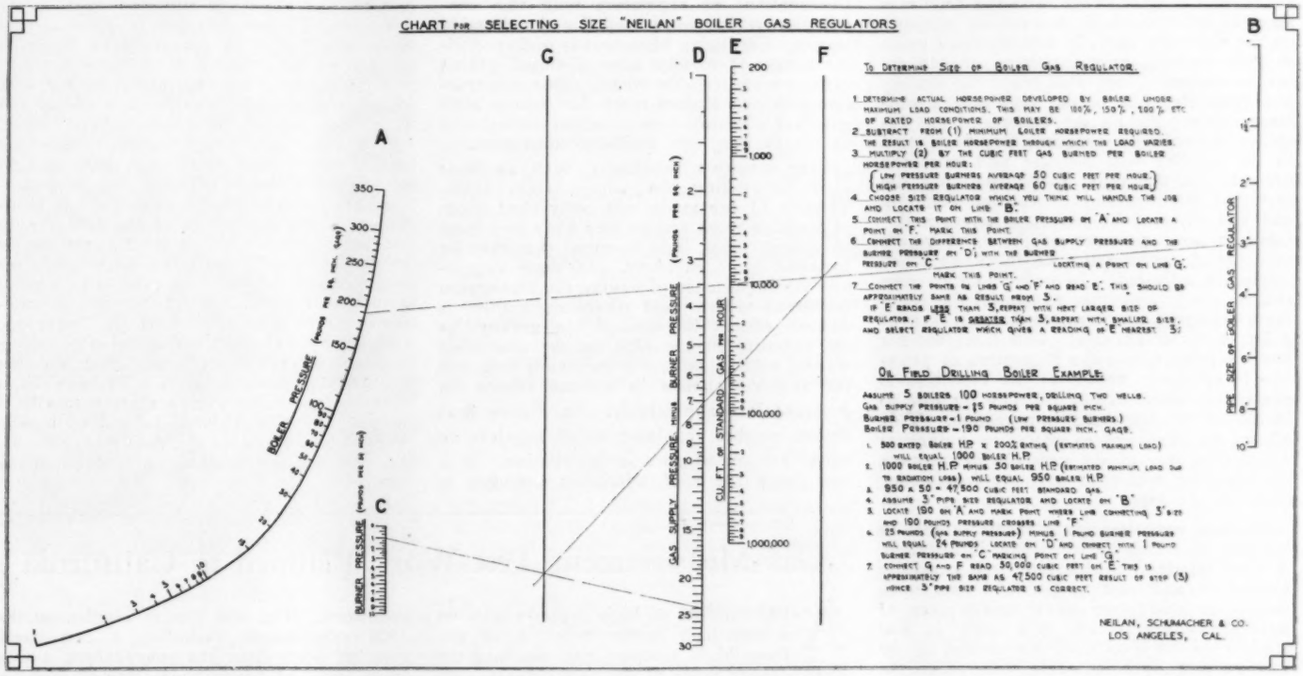
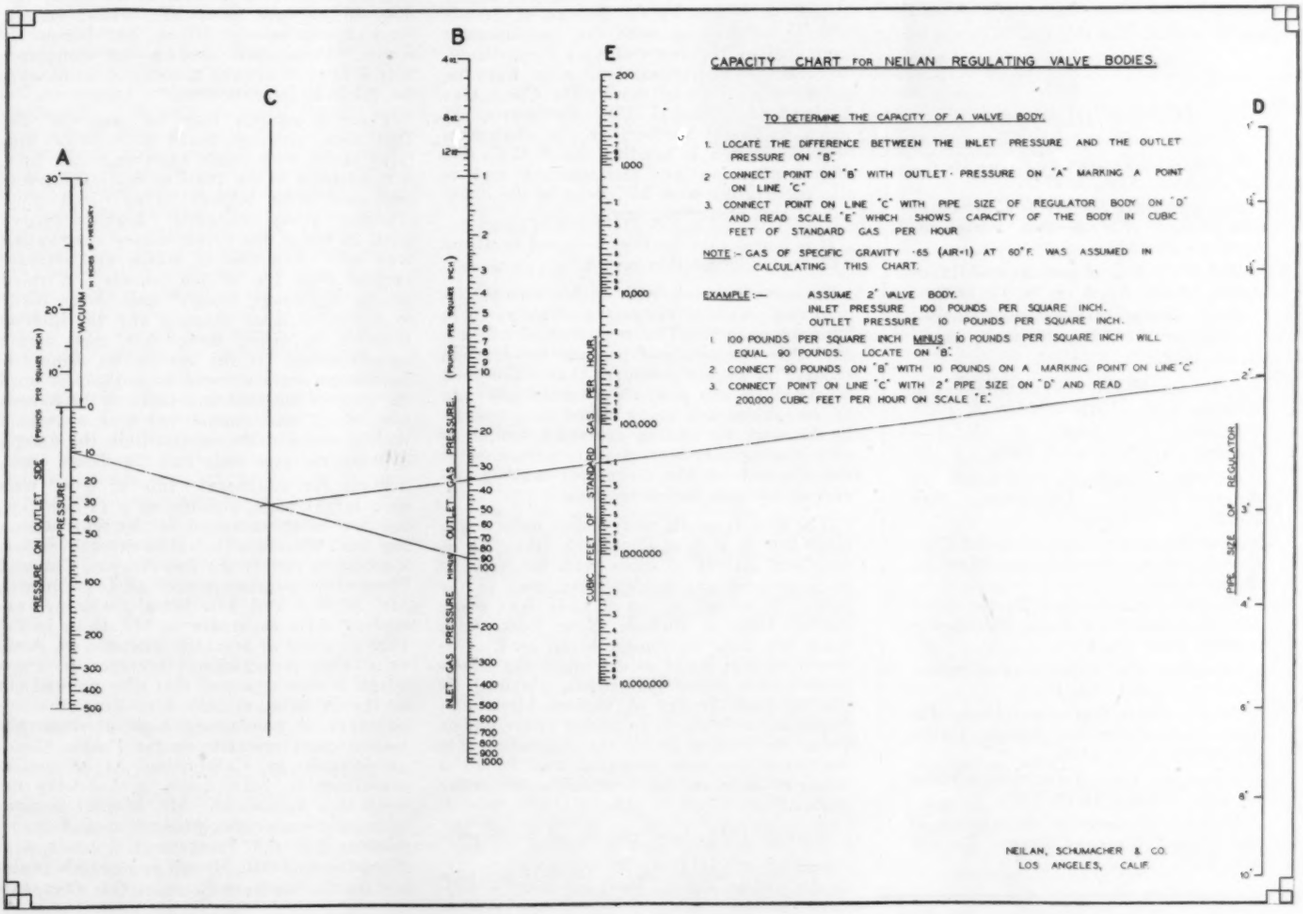


CHART FOR SELECTING SIZE "NEILAN" BOILER GAS REGULATORS
A
B
C
D
E
F
G
BOILER PRESSURE (POUNDS PER SQ. INCH)
BURNER PRESSURE (POUNDS PER SQ. INCH)
GAS SUPPLY PRESSURE MINUS BURNER PRESSURE (POUNDS PER SQ. INCH)
CU. FT. OF STANDARD GAS PER HOUR
PIPE SIZE OF BOILER GAS REGULATOR
To Determine Size of Boiler Gas Regulator
1. Determine actual horsepower developed by boiler under maximum load conditions. This may be 100%, 150%, 200% etc of rated horsepower of boilers.
2. Subtract from (1) minimum boiler horsepower required. The result is boiler horsepower through which the load varies.
3. Multiply (2) by the cubic feet gas burned per boiler horsepower per hour:
(Low pressure burners average 50 cubic feet per hour.
High pressure burners average 60 cubic feet per hour.)
4. Choose size regulator which you think will handle the job and locate it on line "B".
5. Connect this point with the boiler pressure on "A" and locate a point on "F". Mark this point.
6. Connect the difference between gas supply pressure and the burner pressure on "D" with the burner pressure on "C" locating a point on line "G". Mark this point.
7. Connect the points on lines "G" and "F" and read "E". This should be approximately same as result from 3.
If "E" reads less than 3, repeat with next larger size of regulator. If "E" is greater than 3, repeat with smaller size; and select regulator which gives a reading of "E" nearest 3.
Oil Field Drilling Boiler Example:
Assume 5 boilers 100 horsepower, drilling two wells.
Gas supply pressure = 15 pounds per square inch.
Burner pressure = 1 pound (low pressure burners.)
Boiler Pressure = 190 pounds per square inch, gage.
1. 500 rated boiler H.P. x 200% rating (estimated maximum load) will equal 1000 boiler H.P.
2. 1000 boiler H.P. minus 50 boiler H.P. (estimated minimum load due to radiation loss) will equal 950 boiler H.P.
3. 950 x 50 = 47,500 cubic feet standard gas.
4. Assume 3" pipe size regulator and locate on "B".
5. Locate 190 on "A" and mark point where line connecting 3" size and 190 pounds pressure crosses line "F".
6. 15 pounds (gas supply pressure) minus 1 pound burner pressure will equal 14 pounds. Locate on "D" and connect with 1 pound burner pressure on "C" marking point on line "G".
7. Connect G and F read 36,000 cubic feet on "E" this is approximately the same as 47,500 cubic feet result of step (3) hence 3" pipe size regulator is correct.
NEILAN, SCHUMACHER & CO.
LOS ANGELES, CAL.

CHART NO. 2—CHART INDICATING MAXIMU M VOLUME THAT MAY BE PASSED THROUGH REGULATOR VALVE BODIES WHEN THE VALVES ARE AT A FULL OPEN POSITION


CAPACITY CHART FOR NEILAN REGULATING VALVE BODIES.
A
B
C
D
E
PRESSURE ON OUTLET SIDE (POUNDS PER SQUARE INCH)
VACUUM IN INCHES OF MERCURY
PRESSURE
INLET GAS PRESSURE MINUS OUTLET GAS PRESSURE (POUNDS PER SQUARE INCH)
CUBIC FEET OF STANDARD GAS PER HOUR
PIPE SIZE OF REGULATOR
To Determine the Capacity of a Valve Body.
1. Locate the difference between the inlet pressure and the outlet pressure on "B".
2. Connect point on "B" with outlet pressure on "A" marking a point on line "C".
3. Connect point on line "C" with pipe size of regulator body on "D" and read scale "E" which shows capacity of the body in cubic feet of standard gas per hour.
NOTE:- Gas of specific gravity .65 (air=1) at 60°F. was assumed in calculating this chart.
EXAMPLE:— Assume 2" valve body.
Inlet pressure 100 pounds per square inch.
Outlet pressure 10 pounds per square inch.
1. 100 pounds per square inch minus 10 pounds per square inch will equal 90 pounds. Locate on "B".
2. Connect 90 pounds on "B" with 10 pounds on A marking point on line "C"
3. Connect point on line "C" with 2" pipe size on "D" and read 200,000 cubic feet per hour on scale "E".
NEILAN, SCHUMACHER & CO.
LOS ANGELES, CALIF.

the one on the downstream end of the pipe and its control taken out of the pipe just ahead of the inlet flange, and the regulator then adjusted to hold a constant pressure on the upstream tank, it will continue to do so only as long as the volume of gas remains constant, since this keeps the energy loss from the tank to the regulator a constant factor. Should the volume of gas increase, then the pressure loss due to friction in the pipeline will increase and raise the pressure on the tank, notwithstanding the fact that the regulator is working perfectly and has adjusted its valves so as to maintain the same pressure at the inlet where the control connection was taken as when originally adjusted. In order to overcome this it is only necessary to control the regulator from the upstream tank by means of a line to its diaphragm. This line does not need be large unless the fluctuation of pressure is extremely rapid, as the condition is practically static except for flowing due to increased or decreased compression. This allows the regulator to adjust its valves as a function only of the pressure in the tank disregarding whatever pressure losses may occur in the pipe.

Another very important factor is dirt in the line in which the regulator is installed. A new regulator which has been carefully ground in and sent to the field may open only once and close on a small piece of hard substance which will hold it just slightly off its seats until the erosion of the gas passing over its seats will cause the regulator to no longer shut off tight even when it has opened again and the piece of foreign matter been dislodged. It is, therefore, of extreme importance to blow out all lines connected with regulators thoroughly before putting the regulator into service.

For extremely high velocities across valves sometimes even when the gas is clean the erosion is severe. For this condition the seats and discs may be made of tool steel which has been heat-treated to render it very hard. Observations of regulators with this construction which were used for the exacting service of reducing 1500 pounds to 50 pounds for nearly 11 months have disclosed practically no appreciable wear. This construction also has distinct merit for service with gas that contains some foreign matter such as silt or very fine abrasive substances.

Very sensitive regulators, such as those used for taking the vapors from tanks, (Figure 7) are made with very close limits of machine work and as they have less force to operate them, it is essential that they be installed quite correctly. In these regulators the importance of having the diaphragm connected to the point where the control is desired cannot be stressed too greatly, as the pressure in the pipe on the controlled side of each regulator is extremely low and the slightest change in volume affects the pressure loss appreciably. In Figure 8 is shown another regulator which requires an equal amount of care in installation. It is for the purpose of admitting dry gas to tanks during pumping out periods or at times when a severe drop in temperature occurs and the tank pressure goes below atmosphere. Here again it is essential that the control pipe be connected to the tank proper as the pressure in the pipe connecting the outlet of the regulator with the tank changes continually with the flow of gas and is no criterion of the pressure in the tank.

We have only briefly touched upon the newer theories which are entering the field of automatic control. Those we have examined are the most important underlying principles which have come to the industry in the past year or so. It is only reasonable to predict that in the next year we may see improvements and control carried to a point as yet undreamed. Only the surface of automatic control has been scratched. Today one manufacturer builds hundreds of complete automobile frames each day that are not touched by human hands. Perhaps in a few years we may even see regulators built in our factories without the aid of human hands—and when we do, then truly will we be entering the field of applied automatic control.

1929 Calendar

Commercial Section of P. C. G. A., Los Angeles, April 8, 1929.

Gas Appliance Society of California, Gas Range Week—San Francisco, April 15-20, 1929.

Mid-West Gas Association—Minneapolis, Minn., April 15, 16, 17, 1929.

Sixth Annual Meter Short Course—University of Okla., Norman, April 16-19, 1929.

Arkansas Utilities Association—Hot Springs, Ark., April 30-May 3, 1929.

Natural Gas Dept., A. G. A.—Kansas City, May 6-10, 1929.

Natural Gasoline Association of America—Tulsa, Oklahoma, May 21-22.

Joint Production and Chemical Conference, A. G. A.—Chicago, May 27, 28, 29, 1929.

Northwest Conference, Pacific Coast Gas Association—Victoria, British Columbia, June 7-8, 1929.

Canadian Gas Association—Ottawa, Canada, June 13-14, 1929.

Pacific Coast Gas Association, Annual Convention—Del Monte, Calif., September 10-13, 1929.

American Gas Association—Atlantic City, October 14-19, 1929.

Utilities Association Secretaries of the United States—Chicago, December, 1929.

Gas Measurement Test Work Planned *in* California

A PROGRAM of high pressure tests on a four-inch orifice meter using gas from high pressure gas wells in the Kern County fields of the San Joaquin Valley, California, has been outlined, to be conducted by H. S. Bean, chief of the Gas Measuring Instruments Section of the Bureau of Standards, who has been in Southern California since November 1, 1928, continuing his research on large volume measurement of gas. This research program, begun several years ago by the Bureau of Standards in conjunction with the measurement committee of the Natural Gas Department, American Gas Association, now has the active cooperation of the Pacific Coast Gas Association's Natural Gas Committee, of which William Moeller, Jr., is chairman. Fred A. Hough is heading the P. C. G. A.'s subcommittee on gas measurement and is also cooperating with Mr. Bean in the interests of this committee work.

It is hoped that the tests referred to above will be conducted this month.

Previous research with orifice meters has involved pressures ranging as high as three hundred pounds. The new studies will extend this research and provide information relative to higher pressures than have been observed in the past. California gas and oil companies are being asked to cooperate in the work by lending necessary equipment and placing members of their personnel at the disposal of Mr. Bean, for making observations and recording data.

The first research with orifice meters was made late in 1925 at Cleveland, Ohio. Three four-inch orifices in series with the first lift of a covered gas holder were used in the tests. A second series of tests was made during 1926 at Buffalo, New York, with much the same equipment being used. Observation was made to determine the effects upon orifice meter indications, obtained by placing pipe fittings of various kinds and combinations close to an orifice meter flange. From the results noted, the committee that conducted the tests prepared and issued a tentative code on the installation of orifice meters.*

During 1927, two groups of tests were conducted. The first was to supplement the 1926 experiments, including a few check tests on work done the year before, and a short series of "disturbance fitting" tests, in which a four-inch line replaced the eight-inch pipe previously used. The other group, or "rate of flow" tests, gave the committee opportunity to study orifices, ranging in diameter from one to six and one half-inches, in an eight-inch line. The rates of gas-flow through these orifices, as shown by the drop in pressure across the orifice, ranged from approximately 10 to 400 inches of water. From these studies, the committee was able to determine a series of coefficients for these sizes of orifices.

Three groupings may be made of the 1928 tests, although many of the first and third series were made together. The first, a supplement to the "rate of flow" tests, was conducted with orifices in four-inch pipe. Another group included "high pressure" tests, in which the orifice under observation was used in a line in which the pressure ranged from 100 to 300 pounds. A third group, of "flange design" tests, were made to determine what effect, if any, the interior form of an orifice flange has upon orifice measurements. In the later series, some orifice flanges were screwed on to the pipe until the ends of the pipe and faces of the flanges were flush, and another set was assembled with a considerable recess within the flanges between the pipe ends and the flange faces.

Plans for additional "rate of flow" tests on a larger scale, possibly on a 16-inch line, are now being arranged for by those directing the 1929 research. It is expected to use a set-up in one of the Los Angeles Gas and Electric Corporation plants at Los Angeles. Mr. Moeller and Mr. Hough, who are extending their assistance to Mr. Bean in the 1929 program of research, attended an American Gas Association conference in Pittsburgh a year ago, and that time pointed out to the Association and Mr. Bean the advantages of conducting high pressure gas measurement research on the Pacific Coast, particularly in California. At a similar conference in Saint Louis in February the work was authorized. Mr. Moeller is manager of natural gas production and transmission for the Southern California Gas Company and Mr. Hough is research engineer for the Southern Counties Gas Company.

* These tests were described by Mr. Bean in a paper appearing in *Western Gas* for March, 1929.

C. O. G. Miller

Major Gas Consolidation Announced *in* March

ONE of the most significant developments in the history of Pacific Coast utilities came the middle of last month in the announcement of the passing of control of the Southern California Gas Corporation to the Pacific Lighting Corporation, combining utility properties with assets aggregating $192,011,329. Officials of the Pacific Lighting Corporation on March 12 announced consummation of plans for the exchange of 213,000 shares of Pacific Lighting Corporation common stock to be issued from the treasury for that purpose, for 600,000 outstanding shares of Southern California Gas Corporation common stock. Bond & Goodwin & Tucker, Inc., bankers of Pacific Lighting Corporation, are handling the transaction. No new financing is involved, as the entire deal is being transacted on a stock exchange basis, share holders in the Southern California Gas Corporation to receive .355 shares of Pacific Lighting Corporation common for each of their shares.

This merger brings under one control the Los Angeles Gas and Electric Corporation, Southern Counties Gas Company, together with other Pacific Lighting subsidiaries, and the Southern California Gas Company, which together serve gas to most of the principal centers of Southern California.

The bringing of the Southern California Gas Company into the Pacific Lighting Corporation system marks an important step in the growth of this large utility holding company, the organization of which dates from 1886. Into the growth of this system have gone the energies of many leaders in western utility operation and finance, chief credit for the rise of the company being due rightly to C. O. G. Miller, president of the Pacific Lighting Corporation.

MULDROW, OKLA., NOW HAS NATURAL GAS

Muldrow, Oklahoma, is now being supplied with natural gas. The United Service Company has the franchise, and supplies the town from the Gans field in Sequoyah county, Oklahoma.

Mid-West Gas Association Near Convention Dates

THE Mid-West Gas Association, comprised of members from the states of Iowa, Nebraska, Minnesota, and North and South Dakota, are looking forward in anticipation to the forthcoming convention of that organization to be held in Minneapolis, Minnesota, April 15, 16 and 17.

Officers of the Mid-West Gas Association are Louis Stein, president; E. H. Vieregg, vice-president; and Roy B. Searing, secretary-treasurer. Mr. Searing's appointment is of recent date and was announced in the March issue of *Western Gas*.

The advisory council of the Association includes H. R. Stephenson, Des Moines, Iowa; F. C. Hoffman, St. Paul, Minnesota; H. J. Butler, Council Bluffs, Iowa; L. W. Wade, Fort Dodge, Iowa; C. C. Helmers, Lincoln, Nebraska; and W. E. Derwent, Rockford, Illinois.

Headquarters for the convention will be at the Nicollet Hotel in Minneapolis, and entertainment is under the direction of J. K. Swanson, vice-president and general manager of the Minneapolis Gas Light Company.

Major Alexander Forward, managing director of the American Gas Association, will address the convention. Other speakers on the program include George E. Whitwell of the Philadelphia Company; H. A. Groth, of the William H. Rankin Advertising Company; Professor H. B. Dorau of Northwestern University; J. C. Miles, of the Warm Air Furnace Company; Roy W. Johnson, of the Time-O-Stat Company; and Dr. D. C. Goudiss.

CALIFORNIA GAS CONSUMPTION GROWS IN 1928

During the year 1928 the state of California utilized 350,000,000 m.c.f. of gas, valued at $21,000,000, against 220,000,000 m.c.f. during 1927, valued at $19,000,000, showing an increase of $12,000,000 in gas valuation.

SOUTHERN COUNTIES GAS CO. REPORTS GOOD YEAR

Southern Counties Gas Company's net earnings for the 12 months ending October 31, 1928, amounted to $2,653,753.81, showing an increase over the preceding 12 months of $133,606.10.

STANDARD GAS AND ELECTRIC CO. REPORTS GAS CONSUMER GAIN

Standard Gas and Electric Company, operating utility properties for H. M. Byllesby Company, reports a 3.4 per cent gain in gas customers during 1928.

M. C. WOLFE IS NEW DOHERTY REPRESENTATIVE IN DALLAS

Morgan C. Wolfe has been appointed district sales manager in charge of the Dallas office of Henry L. Doherty & Company, succeeding E. A. King, who has been appointed sales manager of the Des Moines, Iowa, office.

Kansas City Convention Highlight *on* May Calendar

NATURAL gas men of the nation are making plans this month for a trip to Kansas City for their annual reunion in the convention halls of the Natural Gas Department, American Gas Association. These yearly meetings, held in centers contiguous to the natural gas territory, are rightly regarded as indispensable to the technical advancement of the natural gas branch of the industry, providing opportunity for specialized exhibits and program features. The Kansas City sessions on May 6-9 will be no exception, for unusual care has been taken this year in the set-up of arrangements for program, exhibits and entertainment.

Many speakers of national prominence in the industry have a place on the program, among whom are:

J. J. O'Brien, Chicago, president of the Byllesby Engineering and Management Corp.; H. C. Abell, New York, vice-president, Electric Bond and Share Co., and R. W. Gallagher, Cleveland, president, East Ohio Gas Co.

Sessions will be held on Tuesday, Wednesday and Thursday in the Missouri Theater, across the street from Convention Hall.

If the amount of exhibit space reserved is any indication of the size of the gathering, this Convention will be the largest of the natural gas group yet held. Several weeks ago the list of exhibitors applying for space had passed the 100 mark. Every appliance and item of equipment used in the industry will be shown at Convention Hall, when the committee working with C. W. Berghorn, director of exhibits of the American Gas Association, has completed its work.

Transportation Arrangements

FOR detailed information on transportation arrangements for the Kansas City Convention, communicate with the following members of the Transportation Committee:

Pacific Coast:

Wm. D. Dickey, Pacific Meter Works, 495 11th Street, San Francisco, California.

Mountain States:

George Wehrle, Public Service Company of Colorado, Denver, Colorado.

Southwest:

Wm. C. Grant, Lone Star Gas Company, Dallas, Texas.

Western Gas Salesmen's Competition

Prizes: $50.00 in Gold Each Month

Contest Details Published Elsewhere on These Pages

Range Contest Winners Announced—Water Heater Competition Now on—Refrigeration Is New Topic

WE WILL LEAVE IT to the judge, Clifford Johnstone, to announce winners in *Western Gas'* first Salesmen's Competition on GAS RANGES. The three top "men"—one of whom, incidentally, was a sales*lady*—already have their prize money—$25 to first place, $15 to second, and $10 to third. Names of the three fortunates are given by Judge Johnstone elsewhere on this page. Prize winning replies on the range contest also are published here this month, as well as three honorable mentions which merit special attention. These replies are all good reading — they come from the experience of successful salesmen, and, together with Mr. Johnstone's review of the gas range contest, they should be read and digested.

LEWIS H. CALHOUN

First Prize Winner Gas Range Contest

THE WATER HEATER CONTEST, announced last month, will close on April 15. Manuscripts will be accepted up to that date and there is still time to get in a last minute entry. Read last month's *Western Gas* for the contest conditions. Winners in this water heater contest will be announced in next month's issue.

With this announcement the third *Western Gas Salesmen's Competition* officially opens. GAS REFRIGERATION is the timely topic, and the conditions are simply these: EACH CONTESTANT MAY HAVE 300 WORDS IN WHICH TO GIVE HIS IDEAS ON HOW TO SELL DOMESTIC GAS-FIRED REFRIGERATORS.

Gas refrigeration is new. So is gas refrigeration salesmanship. What are the most direct, effective methods which can be used to sell this newest gas appliance?

Read the contest terms appearing in the box on the opposite page and get in on this contest! The manuscripts—not to exceed 300 words—must be in the hands of the editors by May 15. Winners announced in June.

THE CONTEST JUDGE COMMENTS . . . .

UNDER DATE OF MARCH 15, Clifford Johnstone, executive secretary of the Pacific Coast Gas Association, who is directing the judging of contest entries, addressed the following letter to WESTERN GAS, summarizing the results of the competition on gas ranges:

Mr. Geo. H. Finley, Managing Editor, *Western Gas,*
124 West 4th Street, Los Angeles, California.

My dear Mr. Finley:

It has been a privilege as well as a task of some magnitude to act as judge in your gas range contest. All of the papers submitted were splendid and it is encouraging to know that there are so many excellently equipped salesmen on the firing line for the gas industry.

I wish to recommend the following for the prizes which you have offered:

First Prize: **Lewis H. Calhoun,**
Portland Gas & Coke Co., Portland, Ore.

Second Prize: L. H. Paull,
Spokane Gas & Fuel Company, Spokane, Wash.

Third Prize: L. S. Schermerhorn,
Montana-Dakota Power Co., Miles City, Mont.

It perhaps would be pertinent for me to include with these recommendations some discussion of the procedure which was followed in judging them.

We have found that your rule concerning the permissible number of words has been a factor, as the use of too many words has been the cause of us withdrawing consideration from three excellent papers, those by Joseph A. Evers of the Laclede Gas Light Company of St. Louis, J. W. Black of The Arkansas Valley Gas Company of Arkansas City, Kansas, and Justin McMurray Kennedy of the Southern Counties Gas Company at Santa Monica, California. I wish particularly to recommend that you publish these three papers as they are excellent from every point of view.

(See Page 37.)

¶ Every salesman has his own ideas as to what are the most telling arguments in gas range selling. Are these prize-winning arguments in the "*Western Gas* Salesmen's Competition" really the most effective ones? Read them and judge for yourself!—*Editor.*

FIRST PRIZE

Lewis H. Calhoun, Portland Gas and Coke Company, Portland, Oregon

I. ECONOMY

Mrs. Customer, a gas range is the most economical range you can buy. It is economical of time—there is no waiting for it to heat up, as the heat is applied instantly to the utensil, thus your meal cooks more quickly than with any other type of range. It is economical of labor—is operated with the least possible effort and attention, no ashes to remove, no dirt, even cooks during your absence. Is economical of fuel, is highly efficient, consumes no more fuel than is actually needed and gas is a very inexpensive cooking medium.

II. DEPENDABILITY

Mrs. Customer, with this gas range you use the one fuel which is always delivered at the instant needed, without effort or worry on your part and in the exact quantity required.

With this oven-heat regulator you have a constant, even temperature, the exact amount of heat you need as long as you wish, this insures perfect baking and oven cooking. You may put your dinner in the oven and go shopping and be absolutely certain that it will be as perfectly prepared as if you had stayed to watch it.

III. PERSONAL SATISFACTION

Mrs. Customer, this is a gas range which you will be proud to have in your kitchen and show to your friends. It will exactly match the color scheme of your kitchen. It requires so little time and effort to operate and your results are so dependable that meal planning and preparation for your family and guests will be a pleasure.

You will have much more time to devote to the interests of your family and to your personal enjoyment with that feeling of a perfectly operated home that we value so much in this age.

SECOND PRIZE

L. H. Paull, Saleslady, Spokane Gas & Fuel Company, Spokane, Washington

I. *"Modernize your kitchen—with a modern gas range!"*

Every modern housewife has replaced oak dressers, what-nots and highboys of another day with newer and more attractive pieces. Many housewives who have applied themselves so diligently to keeping the rest of the house up-to-date, are now realizing that their kitchens are not in keeping with the standards maintained in other parts of the house. They discover, to their amazzement, that the range is an antique—old fashioned and inefficient.

It is an easy thing to modernize the kitchen—and one may be justly proud of the difference made by the installation of one of these graceful new ranges.

II. *"Come out of the kitchen, Mother"*

Greater freedom is possible for the housewife with the modern gas range. Because of the heat control she doesn't have to spend her time watching the oven—it is no longer necessary for her to stand for hours at a time over a sizzling hot stove. When the regulator is set, she knows that it will maintain an even, steady heat.

It is no longer necessary to adjust drafts, clean up ashes and blacken lids—in short, the modern gas range takes all the drudgery out of baking and cooking and makes housework a pleasure.

III. *"Instant heat—no waiting!"*

Tick, tock—hurry up—tick, tock—hurry up. All day long it goes—more speed, more speed. More things to be done in less time. And so with everything else, more speed is demanded in the kitchen. The gas range supplies the quickest heat of any fuel—just turn the valve, press the lighter—heat, instantly! Because it takes less time for cooking, there is more time for other things—more time to spend with the children—more time to plan menus, parties, to meet friends—more time to really enjoy living.

THIRD PRIZE

L. S. Schermerhorn, Montana-Dakota Power Company, Miles City, Montana

I. *ECONOMY:*

You want to get the most with the least expenditure of time, money and energy. The gas range solves this problem for the kitchen. No household convenience saves so much as a gas range. No waste of heat, just press the lighter, turn on the gas and the fire is ready for quick but thorough cooking.

A gas range saves one hour or more a day, and one hour at 30 cents per hour will pay for a gas range in a year.

Save time, worry, and vexation by using a gas range.

II. *CLEANLINESS:*

The good housekeeper strives to keep the kitchen from becoming dirty as much as to clean out the accumulated dirt. A gas range produces no ashes to scatter over the kitchen and into the food. There is no coal to handle, no tracking in dirt from the coal bin, for the gas range delivers the fuel to

(*Continued on Page 38*)

THE CONTEST JUDGE COMMENTS . . . . . *Continued*

Other papers were excluded by reason of the use of specific arguments concerning features which are to be found only on one or two makes of ranges. This applies to the insulated oven and we have also for this reason set aside papers whose chief argument concerned the advantage of the solid top, as such arguments, in our opinion, when strongly stressed, are a direct criticism of the open top gas range which has many followers. Also withdrawn from consideration were those papers which presented the approval seal of the American Gas Association Testing Laboratory as a principal sales argument. It is the ambition of the American Gas Association that this seal be looked upon as a necessity rather than an argument, and several very excellent papers were laid aside because of this.

Mr. Calhoun wins first prize without any question. His arguments cover the field in a very thorough manner and answer resistance offered by the users of solid fuel appliances, old gas ranges and electric ranges, and brings out the idea of economy, dependability, and the appeal to pride. The only criticism we have is the tendency toward negative argument in his first paragraph where he speaks of there being no ashes to remove and no dirt, instead of stressing cleanliness.

Second prize is awarded to L. H. Paull, the only woman in the contest, because her arguments also cover the entire field of competition and stress the convenience and speed of gas over every other cooking medium. Her argument that it is time the women take pride in their kitchens as well as their living rooms, is an excellent one and we note that many papers bring out this thought.

Mr. Schermerhorn wins third prize because of the force and strength of his arguments. Mr. Schermerhorn wastes no time with idle words and while he speaks more than others, and in a negative way, about the disadvantages of using coal in the kitchen, it must be realized that coal is evidently his greatest competitor and his arguments must be directed against it.

I would like to take this opportunity of commenting on some of the other papers submitted. As I have stated before, I have been much impressed by the paper by Jos. A. Evers. This presents not only an argument but a procedure and I have my wife's word for it that Mr. Evers would have sold her a gas range. He has no high pressure methods but he does not permit the customer to overlook the higher priced ranges and he gives them credit for the intelligence which they undoubtedly possess in urging them to handle the range as he explains its mechanical details. The stress he places on gaining the confidence of the customer in the customer in the company's service is also effective in many cases and, by the way, was brought out by only one other contestant.

J. W. Black also brings out a point which should not be neglected in any sale, and that is the salesman should, as a first step, try to find out something about the customer and her needs.

Leo. E. Vaughn of the Public Utilities Consolidated Corporation of Pocatello, Idaho, brings out another effective argument in comparing the obsolescence of a

(*See Page 38*)

CONTEST CONDITIONS

Subject: SELLING DOMESTIC GAS REFRIGERATION

Each Contestant may have 300 words in which to give his ideas on how to sell domestic gas-fired refrigerators.

Who May Compete: Any regular reader of WESTERN GAS who is engaged in selling gas appliances to the public, either through gas utilities or dealers.

Prizes: For the manuscript incorporating the best sales ideas on domestic gas refrigeration, $25.00 in gold. For the second best manuscript, $15.00 in gold. For the third best, $10.00 in gold.

Contestants will be limited to 300 words. No mention of manufacturers' products by trade name may be made, and contestants should refrain from comparing one manufacturer's product directly with another.

Manuscripts must reach publication offices of WESTERN GAS, not later than *May 15, 1929*. Address all communications to *Contest Editor,* WESTERN GAS, 124 West 4th Street, Los Angeles, Calif.

Name, address, company affiliation and position of contestant must appear on each page of manuscript. Double-spaced, typewritten replies, printed on one side of sheet only, are preferred. Manuscripts become property of WESTERN GAS, to be published or withheld as desired, and no responsibility for their return is assumed.

Winning replies will be published in the June issue of WESTERN GAS and prize money paid to winners at that time.

Judging of replies will be conducted by Clifford Johnstone, Executive Secretary of the Pacific Coast Gas Association, assisted by a committee.

Monthly Contests: **In the May issue of *WESTERN GAS* another Salesmen's Competition, open to readers of *WESTERN GAS* (Prizes, $50.00 in gold) will be announced, the winning replies to be published in the issue of July, 1929.**

THE CONTEST JUDGE COMMENTS . . . . . *Continued*

coal range or an old type gas range with an old model automobile. This is a hackneyed comparison, it is true, but due to the pride people have in their automobiles, perhaps in no better way can obsolescence be described.

Ray C. Montgomery of the Southern Counties Gas Company, San Pedro, California, is one of the few contestants who brings out the fact that what might be an effective argument for one is poison for another. Like Mr. Black, he first tries to find out something about his customer and presents his arguments accordingly.

Two papers, those of Justin M. Kennedy, Southern Counties Gas Company, Santa Monica, and Norman B. Terry of the Laclede Gas Light Company, St. Louis, Missouri, presented arguments against the "eating out" habit as opposed to the pleasure of gathering around the family table. This argument might be very effective in some cases, especially in house-to-house canvassing.

Yours very truly,

CLIFFORD JOHNSTONE,
Executive Secretary, Pacific Coast Gas Association,
San Francisco, California.

CJ:FI

THIRD PRIZE

(*Continued from Page 37*)

the burner, no blackened kettles to clean and no coal hods in the kitchen.

A gas range is the quickest, cleanest known method for cooking. A range for cleanliness.

III. *COMFORT:*

No matter how hot the day is, the fuel in the old range must burn out. A gas range produces just the necessary heat for cooking. Turn off the gas and you turn off the heat and expense. Place your baking in the oven, turn the regulator for the proper temperature, set your alarm clock for the time required, go about your other work. The regulator controls the heat, the clock reminds you when the baking is done. A gas range makes cooking a pleasure, and spells cleanliness, convenience, and economy in the home.

HONORABLE MENTION

Joseph A. Evers, Laclede Gas Light Company, St. Louis, Missouri

The three most effective arguments I use in selling Gas Ranges are:

"The Benefits of the Appliance."
"Making Suggestions."
"Gaining the Customer's Confidence."

(1) Every customer wants more than a machine or just something to do her cooking with—she is vitally interested in what benefits are going to be derived from a certain range. I try to picture certain results with the oven heat regulator; it does more than make cooking easier, it eliminates absolutely all guess work; the ingredients used in cooking are carefully measured, the oven control measures the heat, it does more than make cooking easy, it makes it sure; I tell her about having more leisure time, an entire meal can be put in the oven, and after an absence of five hours, her meal is completely cooked; absolutely dependable.

(2) I find that making suggestions leads to many sales. I find out and make certain of the customer's general familiarity of the range before explaining different parts thoroughly; I lead them from the cheaper series to the more substantial line of ranges; show them the difference in construction, picturing the beauty to harmonize with the other surroundings of her kitchen. I let the customer see and handle each part as I explain it, showing what it does, and why it is of benefit. Demonstrating a range in this manner gives her a clearer impression, makes her more interested, and causes her to acquire a sense of ownership of the appliance.

(3) I gain the customer's confidence. To close a sale the complete confidence of the customer must be gained; she must believe in the house she is dealing with, the service that the company renders, in standing firmly behind every piece of merchandise that is sold; service is the Gas Company's chief aim, for that is the basis of its whole existence. "Our service department is always at your disposal, it is to our best interests, to keep all of our customers' appliances in first class condition." In the customer's eyes the salesman is the Gas Company, they accept the salesman's attitude as the company's attitude. If the customer's confidence is gained a sale is made.

HONORABLE MENTION

J. W. Black, The Arkansas Valley Gas Company, Arkansas City, Kansas

(1) When selling a gas range I first ascertain if possible how much cooking is done in the home (this is often done by asking the number in the family), then select a range that is the size best suited to their needs and if they have not stated that they wanted something inexpensive, I will show them a good range at the beginning. It is much easier to go to a lower price than to a higer price. And then by showing good ranges you will build up your sales more rapidly and possibly have better satisfied customers.

(2) Secondly, I would give a general outline of the range by calling attention first to the oven heat control, how that by simply turning the control she can regulate the amount of gas burned in the oven to give the exact temperature that she needs for preparing a certain dish; then show how that the oven itself is so constructed that it gets the maximum heat for the amount of gas burned; that it is fitted with enamel linings which will not rust, thereby prolonging the life of the range; also call attention to the top burners, the throat being so designed that it maintains the proper proportion of air in the burner no matter how high or how low the gas is turned on.

(3) Thirdly, in explaining this range to my customer I have tried to paint a real picture to her by showing her the real benefits to her and by lastly appealing to her pride; how that by placing the range in her home she will have made the cooking easier and better, the kitchen more attractive and considering the time she spends in the kitchen from day to day, after all should not the kitchen be made as attractive as any other part of the home!

HONORABLE MENTION

Justin McMurray Kennedy, Southern Counties Gas Company Santa Monica, California

I. APPEARANCE

"Truly a thing of beauty, isn't it Mrs. Lottakale? Yes, and a joy forever. A handsomely enameled range like this installed in your kitchen will not only add materially to the pleasantness of your surroundings, but its appeal will also increase your enjoyment in preparing meals. Beautiful ranges such as this have given a tone of happiness and contentment to 20th century cookery that has heretofore been lacking. Having spent considerable care in choosing your furniture for the other parts of the house, it is only natural that you should devote as much time in selecting a gas range of which you will always be proud.

II. CONTROL

"With the press of modern social activity, Mrs. Lottakale, women like yourself devote many afternoons a month visiting and partying. Because of this the manufacturers of the ——— range have developed the oven heat control to a point where it is almost human. Only a few minutes need be spent preparing the meal. After placing it in the oven and setting the thermostat as designated on the chart you can leave the house and forget all about it. When you return the meal is cooked to a turn—just as delicious as if you had spent the afternoon watching and waiting.

III. SPEED

"It's true, isn't it, Mrs. Lottakale, that what once satisfied us is now considered obsolete? Speed seems to typify our modern civilization. When the horse became too slow, people turned to the trolley-car. Then came the universal desire to drive your own car. In exactly the same way—housewives rebelled and turned to cafeterias, weary of getting dinner over a worn-out stove. But with the perfection of the modern gas range which enables quick, certain and easy preparation of home-cooked meals, the lady of the household has come back to the kitchen of her own free will."

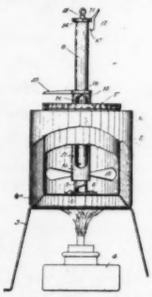
(Note: Although possessed of a considerable amount of the worldly goods, the above prospect was just old-fashioned enough to do her own cooking. Our job is to cultivate more of that old-fashioned variety.)

WICHITA GAS COMPANY REPORTS 160 REFRIGERATORS SOLD IN FEB.

A record month for the sale of gas refrigerators is reported by the new business department of the Wichita Gas Company, with 160 sold during February. Seventy-six of these were placed in apartment houses.

THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,686,630. DIRECT-READING VISCOSIMETER. FRANCIS ELLERY FITCH, Philadelphia, Pa., and MAYSON WHITE TORBET, Jackson, Mich. Filed July 15, 1924. Serial No. 726,191. 9 Claims. (Cl. 265—11.)

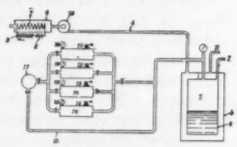


4. A viscosimeter comprising a propeller, means for mounting the propeller to have free rotary movement and bodily movement in the direction of the axis of rotation, means for limiting the extent of axial movement and means for indicating the extent of rotary movement relatively to a definite point of reference.

1,685,883. PROCESS OF SEPARATING GAS MIXTURES. ARTHUR B. RAY, Flushing, N. Y., assignor to Carbide and Carbon Chemicals Corporation, a Corporation of New York. Filed May 4, 1923. Serial No. 636,766. 12 Claims. (Cl. 196—8.)

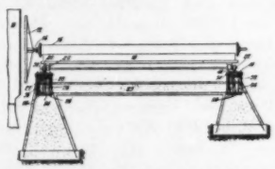
11. Process of separating gas mixtures by the absorption of a water-insoluble constituent thereof in activated carbon which comprises contacting the gas mixture with the carbon and supplying water to the carbon during the absorption to cool the carbon.

1,683,112. GAS-SUPPLYING APPARATUS. ROBERT WEBER, Hayange, Moselle, France, assignor to Les Petits Fils de François de Wendel & Cie., Paris, France. Filed May 12, 1924, Serial No. 712,827, and in France May 22, 1923. 2 Claims. (Cl. 62—1.)



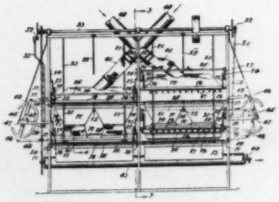
1. A plant for supplying a gas to an apparatus using the same comprising a double wall receptacle adapted to contain the liquefied gas, a heating device embodying an electrical source, an electric resistance and a control rheostat electrically connected together, means for circulating an auxiliary gas between the walls of said receptacle and through said heating device and pipe lines connecting said receptacle to said apparatus.

1,696,259. PUSHER TRACK FOR COKE OVENS. LLOYD F. SCHRADER, Richmond Hill, N. Y., assignor to Foundation Oven Corporation, New York, N. Y., a Corporation of New York. Filed Aug. 31, 1926. Serial No. 132,773. 7 Claims. (Cl. 238—25.)



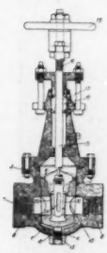
1. Supporting means for rails subject to lateral thrust comprising a foundation having substantially horizontal base portions at different elevations forming a vertical shoulder, a tie having complementary bearing portions and a substantially vertical shoulder portion adapted to abut the vertical shoulder of the foundation and means for securing said tie to said foundation.

1,691,572. BOLTER FOR CARBON BLACK, ETC. WILLIAM S. HOSKINS, Warren, Pa., assignor to Columbian Carbon Company, Williamsport, Pa., a Corporation of Delaware. Filed Dec. 13, 1924. Serial No. 755,604. 8 Claims. (Cl. 209—405.)



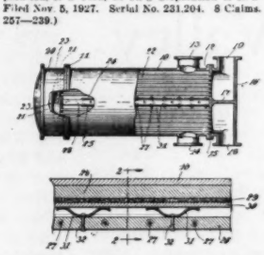
1. A bolter for pulverulent material including a casing having upper and lower separable sections, a screen within said casing, a frame above said screen, brushes carried by said frame in operative relationship to said screen, means for moving said frame back and forth, guiding means for said frame carried by said upper section, lost motion connections between said guiding means and said frame and permitting relative vertical movement, whereby the weight of the brushes is supported by said screen, and means for effecting a relative vertical movement of said sections to separate them, said guiding means serving to support said frame and brushes when the casing sections are separated.

1,689,296. VALVE FOR HIGH-PRESSURE AND HIGH-TEMPERATURE PURPOSES. ORRION D. REDDING, Columbus, Ohio, assignor to The Valve Equipment Company, Columbus, Ohio, a Corporation of Ohio. Filed Mar. 2, 1927. Serial No. 172,124. 10 Claims. (Cl. 251—59.)



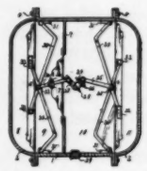
1. In a high temperature valve structure, a valve casing having a valve chamber disposed therein, a valve cage adapted to interfit with said valve chamber, said valve cage having internally raised valve seats integral therewith and said valve cage being adjustable by means externally of said casing to shut off the flow of fluid through the valve structure while repairs or adjustments are being made to the said valve structure.

1,689,900. HEAT EXCHANGER. ARTHUR P. BROCKLEBANK, Elizabeth, N. J., assignor to Foster Wheeler Corporation, New York, N. Y., a Corporation of New York. Filed Nov. 5, 1927. Serial No. 231,204. 8 Claims. (Cl. 257—239.)



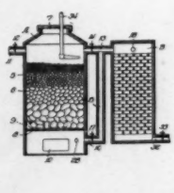
1. In a heat exchange apparatus, a shell, tube plates, tubes extending between the tube plates, a baffle extending longitudinally of the shell and dividing the same into compartments, a packing at the longitudinal edge of the baffle, and means for positively forcing the packing to position to make a substantially tight joint between the shell and the baffle.

1,699,145. GAS METER. ARNO R. HURTTIG, Stratford, Conn., assignor to American Meter Company, Incorporated, New York, N. Y., a Corporation of Delaware. Filed Feb. 28, 1924. Serial No. 695,725. 3 Claims. (Cl. 73—1.)



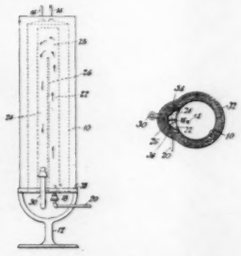
3. In a meter, the combination of the partition 7 having a flexible portion, a diaphragm 5, a diaphragm 6, a crank shaft 17, crank arms 24 and 25 operatively connected to said crank shaft, a link 35 connecting diaphragm 6 with crank arm 24 and a link 34 extending through said flexible portion of the partition and operatively connecting diaphragm 5 with crank arm 25.

1,701,253. METHOD OF PRODUCING WATER GAS. CHARLES W. ANDREWS, Duluth, Minn., and HERMAN A. BRASSERT, Chicago, Ill. Filed July 15, 1922. Serial No. 575,254. 1 Claim. (Cl. 48—204.)



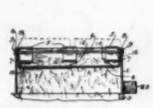
The method of water gas production which comprises, air blasting a mass of carbonaceous residue to raise its temperature, placing a layer of coal on said residue, passing steam into said heated residue to form blue water gas, passing the heated blue water gas through the coal, whereby the heat of the blue water gas serves to volatilize the volatile content of the coal, agitating the layer of coal during the passage of the blue water gas, and continuing the process by alternately air blasting and then adding coal and passing steam into the mass of residue, the blue water gas passing through the added coal, the blast air and the steam being both preheated by heat derived from the air blast gases.

1,691,008. GAS WATER HEATER. ROBERT G. GRISWOLD, Westfield, N. J., assignor to Doherty Research Company, New York, N. Y., a Corporation of Delaware. Filed Dec. 4, 1925. Serial No. 73,167. 2 Claims. (Cl. 122—19.)



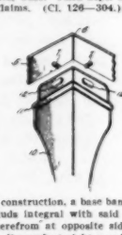
1. An article of manufacture comprising a heat-insulating jacket of fibrous material, a longitudinally extending salient portion formed in one side of the jacket and grooved along its inner face, a partition dividing said portion for the major part of its length into two channels which are in communication at one of their ends, the channels and partition being constructed of fire-resistant material.

1,698,933. GAS BREAD TOASTER. MICHEL A. CHARTIER, Roxbury, Mass. Filed Dec. 29, 1927. Serial No. 243,346. 2 Claims. (Cl. 53—5.)



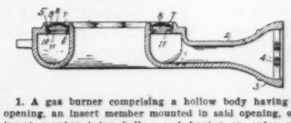
1. A toaster comprising a main body portion, a plate adapted to be heated supported by the main body portion, openings in the plate through which heat may pass, heat deflecting members spaced from the openings, means for supporting the article to be toasted, the support for the plate consisting of sections thereof extending over the edges of the main body portion, the deflecting strips being supported at each end by sections thereof extending over the suitable edges of the toaster.

1,691,762. RANGE CONSTRUCTION. SHERMAN HARTER, Mansfield, Ohio, assignor to New Method Stove Company, Mansfield, Ohio. Filed Sept. 2, 1927. Serial No. 217,179. 2 Claims. (Cl. 126—304.)



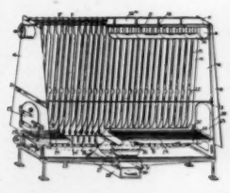
1. In a range construction, a base band having a corner, two threaded studs integral with said band and projecting inwardly therefrom at opposite sides of said corner, said studs being disposed at right angels to each other, a leg having an upper end fitting snugly in said corner and formed with horizontally elongated slots through the outer

1,691,169. BURNER. JOHN P. REINECKE, Lorain, Ohio, assignor to The Hoffman Heater Company, Lorain, Ohio, a Corporation of Ohio. Filed Apr. 20, 1923. Serial No. 633,506. 5 Claims. (Cl. 158—99.)



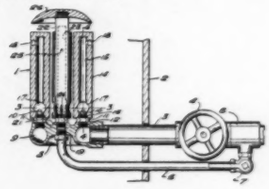
1. A gas burner comprising a hollow body having an opening, an insert member mounted in said opening, said insert member being hollow and having an outer wall which is rounded on its outer surface and flat on its inner surface, thereby providing a wall of varying thickness there being ports drilled through said wall.

1,683,028. APPARATUS FOR SUPPLYING A CURRENT OF HEATED AIR OR GAS. VIVIAN ELKINGTON, St. Margarets Bay, England. Filed Nov. 7, 1927, Serial No. 231,740, and in Great Britain Nov. 11, 1926. 7 Claims. (Cl. 126—104.)



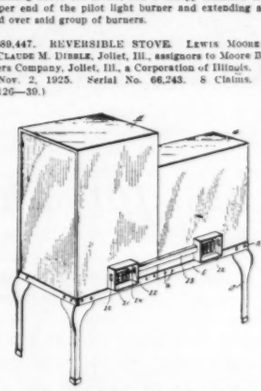
1. A furnace for producing a rapid current of heated air, comprising a pair of end plates, two pairs of walls extending between the said end plates and constituted by a pair of inner metal heating walls converging inwardly and upwardly towards one another throughout their entire length, and a pair of outer walls converging inwardly and upwardly towards the respective inner heating walls to form open air passages diminishing in area from their lower to their upper ends and into the wider lower ends of which air to be heated enters, a heating source confined between the end plates and the said inner walls, and an outlet at the top of the furnace for the products of combustion.

1,696,840. GAS BURNER. HARRY E. DICKINSON, Houston, Tex. Filed Aug. 2, 1926. Serial No. 126,533. 3 Claims. (Cl. 158—104.)



1. A gas burner comprising an annular gas manifold having a plurality of gas jets upstanding therefrom, a group of tubes one to each gas jet mounted upon the manifold and extending upwardly therefrom, a pilot light burner mounted concentrically of and on the manifold within said group of burners and projecting upwardly and terminating above the latter, and a canopy mounted on the upper end of the pilot light burner and extending above and over said group of burners.

1,689,447. REVERSIBLE STOVE. LEWIS MOORE and CLAUDE M. DIBBLE, Joliet, Ill., assignors to Moore Brothers Company, Joliet, Ill., a Corporation of Illinois. Filed Nov. 2, 1925. Serial No. 66,243. 8 Claims. (Cl. 126—39.)

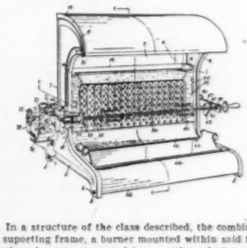


1. A stove, comprising a combined oven section and a burner box section, said sections being formed for reversible adjacent arrangement, and means arranged at the opposite sides of each section for securing adjacent faces of said parts together to combine the sections into a unitary stove construction, said means being also adapted for attaching supporting legs to said sections.

1,702,297. AIR FEED AND VENT FOR CLOSED-TOP GAS STOVES. JOSEPH B. GARDNER, Oakland, Calif., assignor to Hammet-Bray Company, Oakland, Calif., a Corporation of California. Original application filed May 11, 1925, Serial No. 29,365. Divided and this application filed Feb. 3, 1926. Serial No. 85,668. 4 Claims. (Cl. 126—39.)

1. In a stove, a closed top-gas-burner chamber having fresh air inlets adjacent the bottom of different sides thereof and a vent adjacent the top of one of said sides, burners within the chamber adjacent said sides, and a horizontal baffle plate extending across said chamber positioned adjacent said last side and in a plane below the top of said burners and separating the vent and adjacent inlet whereby the fresh air drawn into the chamber through the latter may be caused to contact intimately with the adjacent burner before it may discharge through the vent.

1,702,900. GAS STOVE. HUBERT R. HUMPHREY, Kalamazoo, Mich., assignor to General Gas Light Company, Kalamazoo, Mich. Filed Nov. 6, 1925. Serial No. 67,277. 3 Claims. (Cl. 126—41.)



1. In a structure of the class described, the combination of a supporting frame, a burner mounted within said frame, radiating elements supported in operative relation to said burner, a pair of implement supports provided with racks slidably mounted on said frame, an adjusting rod disposed horizontally at the rear of said frame, said frame being provided with rearwardly projecting supporting brackets for said rod, pinions on said rod cooeting with said racks on said supports, implement driving chucks mounted on one of said implement supports, the other implement support having implement spindle bearings, a motor mounted on said frame, speed reducing driving connections for said motor to one of said implement chucks including a driven shaft permitting the adjustment of said implement supports, said driving connections including a shear pin, and driving connections from such driven chuck to the other chuck.

Welding pipe on the natural gas pipeline from Lea County, New Mexico, to Texas cities

Gas *for the* Rio Grande Valley *in* Early Prospect

THE 200-mile, 16-inch pipeline which will carry natural gas from the Lea County, New Mexico, field to El Paso, Texas, is rushing forward from each end, and will be completed and the gas turned into the city mains by May 15. Already more than 60 miles are finished, and the ditching machines are going along at a rapid rate, to keep ahead of the electric welding machines which are following. Smith Brothers are the general contractors superintending construction.

The electric arc welding of the entire pipeline is being done under the direction of Fred Clark and F. G. Hoffman. A total of 27 General Electric welding equipments are in use, some mounted on Fordson tractors and driven by the tractor engine, and others mounted on trucks and trailers.

The pipe, in 30-foot sections, is strung along the cleared right-of-way. Seven of the 30-foot lengths are then lined up, making a section approximately 200 feet long. One welding crew fixes the sections temporarily in position by tack welding and another completes th welds.

The tack welding machines are self-propelled equipments, as the first welding crew is often some distance ahead of the men who complete the welding operation. The pipe is turned, as the welding progresses, by one man using long-handled tongs. Every seventh joint is an expansion joint. This consists of a short piece of pipe with upset corrugations. This joint adds flexibility to the pipe as well as allowing for expansion and contraction when in use.

After the 200-foot sections are completed, another crew lines them up with the completed pipeline, using a caterpillar tractor and boom. As the pipe cannot now be turned, the welds are made by the "bell-hole" method, in which the operator moves his own position to weld all sides of the pipe, making the weld on the lower side from an excavation dug beneath for that purpose.

Three-sixteenth-inch diameter welding electrodes and a current of approximately 175 to 190 amperes are used, each operator being able to make approximately 13 welds in 10 hours.

After the final welding operation is completed, the joints are tested and then treated with a corrosion resisting compound, after which the pipe is lowered into the ditch.

This project of carrying natural gas to El Paso is under the direction of the El Paso Natural Gas Company, of which Paul Kayser, of Houston, is president; H. G. Frost, of El Paso, vice-president and general manager; Sam H. Benbow, of Houston, secretary-treasurer, and A. L. Forbes of El Paso, general superintendent. It was financed through White, Weld & Company, of New York and the distribution to consumers inside El Paso's city gates will be handled by the El Paso division of Texas Cities Gas Company.

Following the route it does, through deep, drifting sand dunes, across the Pecos River, through the 30-mile "gyp" country, and over the Delaware Mountains, this line carries with it about every sort of engineering problem which might be conceived, and at one point, on the west slope of the Delawares, pipe will be hauled to the top in trucks, from the east, welded together at the summit, and lowered by winches from the rim rock into the canyon below. The salt marsh has been trestled, and the 16-inch pipe, wrapped with a heavy paper and protected by three coats of asphalt paint, will be carried across on this wooden trestle for a distance of a mile.

The route angles in a southwesterly direction from Jal, the gathering field in Lea County, New Mexico, toward El Paso, swinging to the south at a point 20 miles east of El Paso, and from thence following the Rio Grande Valley farming district into the city. For more than 180 miles there will not be one consumer, as from the wells to Clint, Texas, there is not even one village. Two or three ranches may later be served, and the new Carlsbad-El Paso highway may develop small settlements, or filling stations which will use the gas. From Clint to Fabens, Texas, some 15 miles east, a small line will be run, to serve Fabens, a town of about 1,000 inhabitants, the farms in between, and probably the cotton gins that dot the valley for a distance of 50 miles below and above El Paso. As yet it is not planned to serve the upper valley, the farming section lying north of El Paso, but it is considered a probable development. As it stands, this 200-mile line will serve the three or four thousand suburban consumers between Fabens and El Paso, and El Paso itself, with its 135,000 population. However, due to the large poulation of Mexican laborers who are not taking advantage of public utility services, it is estimated that not more than 85,000 of El Paso's citizens will be served by the natural gas.

Trestle across salt marsh, 1 mile long, on the Rio Grande Valley gas pipeline to El Paso, Texas

On *the* Front Line *of* Defense

(Continued from Page 18)

ridiculously low rates because of some temporary conditions such as surplus plant capacity or fortunate power contracts, the continuance of which, of course, is good only so long as such conditions prevail, after which the public must expect to pay higher rates.

So much for the competitive conditions that prevail in the Northwest section of this country. You may be interested in knowing how we are attempting to meet this situation and you may be also good enough to assist us with your suggestions.

As I remarked previously, every locality seems to be handling the situation without very much regard to what is being done elsewhere. In some instances a bold and courageous policy is being pursued and the gas industry is holding its own. Such is not the case in other places and it must be admitted that in such instances the gas industry is not holding its own.

A survey of the Northwest shows that there is no universal remedy for the competitive conditions with which the industry in the Northwest is confronted, but rather it would seem that the gas companies of the Northwest must do all the things conducive to the success of gas companies elsewhere and do them even more energetically and efficiently.

One utility in the Northwest which has so far pretty well held its own against the various forms of competition, has entrenched itself largely behind economical operation, working up of by-products on a large scale, an intensive development of the territory served by long and numerous main extensions, and a policy of low rates, especially in the househeating field. This company has recently revised itse tariff incorporating commodity rates for industrial purposes and domestic rates calculated to encourage the all-gas home.

Another utility which has successfully met competition in the water heating field has done so by meeting the electrical competition on its own ground by the establishment of flat rates for gas water heating and claims to have this situation well in hand, although the writer is not informed whether such a policy has resulted in a loss of earning power. This same company has recently instituted a campaign to popularize gas by educating the public to the importance of the gas industry to the community by attempting to combat the popular notion that gas is a decadent industry.

One combination company in the Northwest has maintained the prosperity of the gas department by favoring the sale of gas for cooking and water heating. It is noteworthy that in this company both the gas and electric departments are unusully prosperous.

Another combination company, however, operating a number of gas properties has recently sold them with the avowed intention, according to the newspaper reports, of going vigorously after the electric cooking load.

It will be interesting to note whether these gas properties under a straight gas management may not prove more successful in holding their own than when occupying the same household with a favorite sister.

Aside from the obvious damage to the gas industry by electric competition there has been a more insidious condition which has come about simultaneously in that the attention of the management and the new business departments of the gas utilities have been so focused on electric competition that they have largely lost sight of the opportunities in other fields.

A recent survey by the company with which the writer is connected, of a certain number of houses on our lines showed the startling fact that whereas 19 per cent of the householders were using electric service for cooking purposes, that there was still 49 per cent using wood and similar fuels for such service.

A further analysis of the situation also indicated that electric competition in this field was almost exclusively limited to the well-to-do class who are, of course, in the minority, and to apartment houses.

The efforts of our company in the immediate future will be to take advantage of this condition, whereby, instead of concentrating to such a large degree in trying to combat electricity in its chosen field, a much larger proportion of new business activity will be directed toward seeking and holding the cooking and water heating load in the smaller and less pretentious homes where the cost of fuel and initial cost of appliances are more largely the determining factor. In this connection it has become apparent in our efforts to meet the electric man on the field of fashion, that we have been merchandising gas equipment beyond the means of the small householder and in the immediate future we propose without at all abating our efforts to hold the high priced business to display and merchandise more moderate priced appliances.

I have, so far, attempted to portray briefly the conditions confronting the gas industry in the Northwest and what some of us are attempting to do to meet the situation.

I have used a military illustration in calling our Northwest section the front line trenches of this battle of fuels. May I go further with my comparison and suggest that in this gathering today we have representatives of the Generals Staff of the Gas Industry.

It does seem to us in the Northwest that the gas industry throughout the United States cannot afford to allow the enemy to gain a foothold in any one section of the country and that it behooves the American Gas Association to study carefully these conditions and to this end I venture to offer to this conference the suggestion that a General Committee be appointed to study the economics of competition between gas and electricity and to determine in so far as may be possible the peculiar fields in which these two great industries may best serve the public at a minimum cost and with maximum profit to themselves.

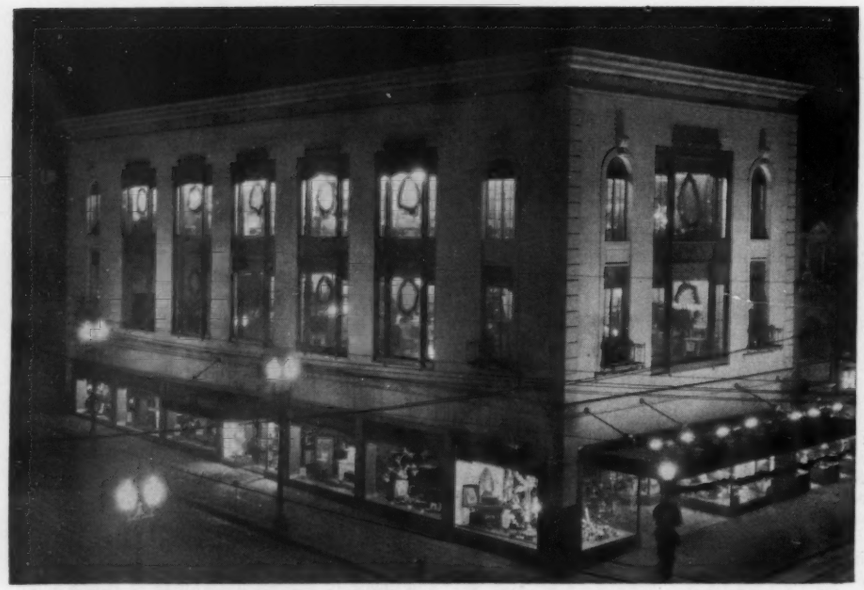
I do not mean by this that I would like to see competition abolished. On the contrary, I believe that this is a stimulation to the development of our respective arts, but I do firmly believe that the respective fields of electricity and gas should be defined as far as may be possible on the basis of rates returning a profit to both industries. I am sure that such an investigation will be as beneficial to the electric industry as it will undoubtedly be to the gas industry.

CITIES SERVICE CO. COMPLETES LINE TO EMPORIA

Cities Service Gas Company recently completed an 8-inch gas pipeline from the Wichita-Ottawa main line to Emporia, Kansas. The city has previously been served by a line tapping the Lipps field in Chase county. The company is also giving service to the Kansas Electric Utility Company's power plant at Emporia.

New Zealand Gas Institute Holds Annual Conference

The photograph above shows members of the New Zealand Gas Institute, called into annual conference at Wanganui, New Zealand, on January 30, 1929. W. J. Stone is president of the New Zealand Gas Institute, and this session was the fifth in the history of this enterprising organization of Antipodean gas men.



Night view of exterior of the B. C. Electric Company's new appliance sales building in Vancouver, British Columbia

New Appliance Sales Building *is* Asset *to* Vancouver Company

ONE of the most elaborate and attractive showroom buildings in western Canada was recently opened by the British Columbia Electric Railway Company at Dunsmuir and Granville Streets, Vancouver, B. C., as announced in a previous issue of *Western Gas*. The new building is especially designed for the purpose of displaying gas and electric appliances of both the domestic and the heavy duty variety.

The building consists of three floors and a basement, all of which are given over to the display of appliances. Provision has been made for the erection of an additional seven stories on the present foundations, should the volume of business warrant this expansion.

Architecturally, the new building commands attention. The exterior is faced with Haddington Island stone, illuminated at night by flood-lights. Interior walls are of tinted plaster, windows are finished in Caen stone, and there is artificial cast stone used in the mantels above the fireplaces, which combines well with the plaster work. The ceiling has been tinted and stippled.

On the main floor two gas fireplaces give an air of hospitality to the store entrance. Customers may recline in armchairs and admire the gas fires while selecting the model which appeals to them most. Rugs, occasional tables, etc., furnish this part of the main floor.

The basement is entirely devoted to gas appliances. Gas hot air furnaces are here displayed in two alcoves. The furnaces have all been treated with heat resisting paint to illustrate how they can be made to harmonize with the walls of a room. Other appliances displayed in various sections of the basement include an incinerator, a gas boiler, and a gas heated laundry clothes dryer. Two alcoves are devoted to water heaters, while in another gas refrigerators are displayed. The center portion of the basement floor is given over to gas ranges.

Pete and Jimmy, two popular canaries, are members of the sales staff in this department, their duty being to demonstrate by their singing that the atmosphere does not become vitiated while these appliances are in use.

Smaller gas appliances are arranged on polished mahogany shelves to facilitate examination by the prospective buyer. Adjoining this display is a selection of hot plates, enclosed space heaters, and gas fittings.

On the second floor there is a model gas kitchen, equipped with range, refrigerator and other modern appliances. Gas laundry units and a model bath room are displayed on other floors of the building.

On the second floor is an auditorium of ample proportions to accommodate large gatherings. This will house the future domestic science demonstrations of the company. The building, costing $600,000, is of structural steel and concrete, and occupies a ground space of 6,000 square feet. Three types of heating are used throughout, and can be seen in operation at any time—a gas vacuum system, a gas hot air system, and a gas hot water plant.

Hotel, Restaurant Sales

(Continued from Page 29)

coal range and installed heavy duty gas ranges. The average bill for auxiliary cooking was $62.36 per month. Since installing gas the average bill is $96.60. The average coal bill for operating the coal ranges was $40.00 per month or a total average bill for coal and gas of $102.36. The total average bill for all gas cooking of $96.60 is a saving of $5.76 per month.

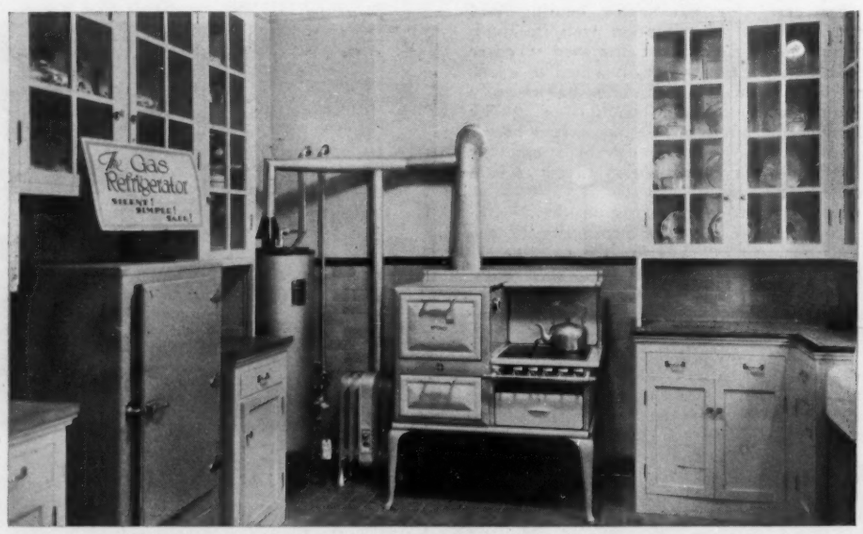
If the cost of repairs for these ranges was added to the oil and coal bills, gas would show a still further saving. It is not claimed that these savings can be made on every installation, but these figures merely go to show that there are cases where it can be done, and this can be determined by a careful analysis of the job to be handled, as there are no two alike.

GAS DISTRIBUTION SYSTEMS OF WYNONA AND SHIDLER SOLD

S. E. Wolff, president, Oklahoma Power & Water Company, has purchased the gas, electric and ice utility systems at Wynona, and the gas distribution system at Shidler, Okla., taking charge of the properties March 5. For a number of years these properties have been operated by J. T. Simpson, manager of the Wynona Gas Company and the Wynona Electric Company.

JAMES WARD NOW STATIONED AT PETALUMA, CAL.

James Ward, North Bay Division salesman, Pacific Gas & Electric Company, has been transferred from Belvedere and Tiburon to Petaluma.



Model kitchen in the B. C. Electric Railway Company's new building, showing gas-fired equipment

Commercial Hydrocarbon Processes

(Continued from Page 24)

Chemists have prepared catalysts by precipitating substances in beakers, decanting, washing the precipitates, molding them as plastics, drying, and subsequently reducing them under carefully controlled temperature conditions with pure hydrogen as a reducing agent. What equipment and methods are proposed for large-scale production? Are not catalysts thus prepared too soft for industrial use? Will catalysts prepared on a large scale, when temperature control is more difficult, be as active as those hitherto prepared in the laboratory?

It is doubtful whether a catalyst can be used industrially for an indefinitely long period. The writer believes that under a given set of conditions a catalyst will have a definite life; that is to say, it must be renewed after a certain period. What will be the life of a catalyst in the large-scale conversion of water gas? What methods and equipment are proposed for revivification or regeneration? What is the total cost of catalyst per unit volume of converted gas?

Laboratory experiments have shown that the temperature of the catalyst must be kept within well-defined narrow limits of variation for optimum results. If overheated, the activity is reduced and carbon or gummy polymerization products may be deposited, which will further reduce its usefulness and shorten its life. The fact that the reactions are exothermic and occur at the surface of the catalyst makes the problem of temperature control more complicated. How should this be done for large-scale operation? The proper design for a reaction chamber can not be determined until this question is answered. Must one resort to recirculation of large volumes of gas for the purpose of controlling temperature, or would it be preferable to employ a plurality of reaction chambers (with or without coolers between them) containing different catalysts whose activities are progressively greater throughout the series? When these problems are solved (and not until then) the capacity of a unit of given size and the amount of catalyst required can be determined. To obtain the necessary information experiments should be conducted on a much larger scale than that possible in laboratory glass tubes.

Varied Reactions with a Given Catalyst and reaction Chamber: A catalyst and reaction chamber are desirable which can be used in common for the production of methane and condensable hydrocarbons and whereby either the former or latter products can be made at will. The indications are that this can be done; it is necessary merely to control the temperature of the catalyst and reactants and to control the velocity of the reactants through the reaction chamber. It might be asked: Can high-boiling (readily condensable) hydrocarbons be produced without the formation of appreciable amounts of gaseous products? If not, what are the limits? It is believed that the chemical reactions which actually occur in the formation of synthetic hydrocarbons are more complex than is indicated by equation 1 to 17, even though the results are the same. The mechanism of the reactions is not definitely known, therefore the limits of control are not known. This phase should be studied further.

Costs: In the final analysis, the use of any process depends upon the cost. Values can not yet be assigned to many cost items that will arise in making the process of hydrocarbon synthesis a part of the manufactured gas process. The gas engineer needs more data to make reasonably accurate estimates of the possibilities in such a combination for large-scale production; he should have more information concerning the costs of the following items:

1. Ground area and additional buildings required.
2. Purification equipment and purifying materials.
3. Apparatus for preparing catalyst and for its revivification.
4. Reaction chamber.
5. Catalysts which can be used.
6. Pumping and extra stand-by equipment, piping, connections, and valves.
7. Apparatus for removng CO_2 from the reaction products.
8. Operation, including labor.
9. Repairs, depreciation, etc.

Approximate values can be assigned to the above items when the process details and process requirements are more clearly defined.

Methods whereby Synthetic Hydrocarbon Processes might be used in the Production of City Gas.

If it be assumed that the technical details involved in the application of a synthetic hydrocarbon process can be disposed of satisfactorily, it is of interest to consider the manner in which the process can be used in conjunction with standard gas-generating equipment. Normally there are two general schemes in which such a process might be incorporated, as follows:

1. Enriching a lean gas, such as water gas, without addition of coal gas.
2. Making coal gas as base gas, using synthetic hydrocarbons in the peak gas only.

A number of different operating methods are possible under each of these schemes, as is indicated in the following list:

I.

A. Make methanated water gas only in amounts as required.

B. Generate water gas continuously at a substantially uniform rate, methanating to the extent of the demand for city gas, using the off-peak water gas for the production of readily condensable hydrocarbons.

C. Methanate water gas for use as base gas only, using gas oil as enricher for peak gas—or vice versa.

II.

A. Make coal gas as base gas and methanated water gas during periods of peak demand, with or without the synthetic production of liquid hydrocarbon by-products during off-peak demand.

The selection of a particular method of procedure under a given set of conditions depends largely upon the following considerations:

1. Cost of necessary equipment per unit of gas-making capacity.
2. Cost of conversion.
3. Cost of raw and purified water gas.
4. Net cost of the finished gas relative to that made by other (standard) processes.
5. Price of gas oil.
6. Value of the condensable, synthetic hydrocarbons which can be made as by-products and which might be used in motor fuels.

Obviously, the synthetic process is favored when the values of items 1, 2, 3, and 4 are low and when 5 and 6 are high.

The method designated as case IA would be applicable when gas oil is high in price and when the cost of the necessary equipment, much of which will be idle a considerable part of the time, is low. There is, of course, a definite relation between the cost of gas oil and the amount of investment which can profitably be made in equipment for production of synthetic hydrocarbons. Method 1B seems to be more ideally suited to conditions prevailing in the average gas works. It is presupposed that the water-gas generators will be in operation continuously; therefore the overhead expense will be reduced to a minimum per unit of gas made. Since the peak demand for gas in our large cities is usually in the winter months, and the period of minimum demand in the summer months, this method when perfected would allow the production of motor fuel chiefly during that part of the year when it is in greatest demand. The methods named under 1C may be indicated when the seasonal fluctuations in demand do not warrant the investment in extra equipment for the recovery of motor fuel, and when the price of gas oil and the cost of methanation bear a definite relation to one another.

Where it is desirable to make a certain amount of coal gas and coke, the methanated gas must be peak gas and not base gas. Accordingly, the synthetic hydrocarbon process can only be used economically in this case (2A) when the price of gas oil is very high and the equipment required for making the peak gas is the minimum.

Not enough data are available to lay out complete plans for the construction and operation of a methanating unit for a gas plant. Figure 6 is a hypothetical flow diagram which is presented to call attention to the fact that considerable special equipment may be required for the successful synthesis of hydro-carbons from water gas. It will be noted that a separate relief holder for blue gas is made in the generators of carbureted-water-gas sets, the relative capacities for the production of different gases are:

Carburted water gas, using gas oil (500 B.t.u. per cu. ft.), cubic feet	1,000
Blue gas, no enrichment (300 B.t.u. per cu. ft.), cubic feet	800
Methanated gas (500 B.t.u. per cu. ft.), cubic feet	414
Methanated gas (500 B.t.u. per cu. ft. when making the maximum amount of motor fuel), cubic feet	200

The gas-making capacity of a carbureted water-gas plant is evidently materially reduced upon changing to methane-enriched gas. The saving made by thus eliminating gas oil must be more than enough to defray the additional expense resulting from reduced capacity. Probably the greatest economy in the production of methanated gas and synthetic hydrocarbons can be made when straight blue-gas generators are used continuously for making the necessary water gas, although the flexibility of operation and gas-making capacity is not so great as when carbureted water-gas sets are used. This difference might be offset by the development of a means for the enrichment of water gas by the use of the synthetic hydrocarbons at low temperatures, in small carbureting apparatus and without the deposition of carbon. Propane, butane, and mixtures with a large proportion of pentane have already been successfully used for enriching water gas by mere vaporization[4].

Whether research will point the way to break up hydrocarbons on an industrial scale without the deposition of carbon remains to be seen. In laboratory experiments this result has already been accomplished with certain hydrocarbons[5]. If the process proves to be practicable, it may materially reduce the amount of water-gas generating-equipment necessary for a given peak production and simultaneously increase the worth of the synthetic process to the manufactured gas industry.

As the calorific standards are lowered, there is a corresponding decrease in the volume ratio of blue gas made to enriched gas (methanated or carbureted, using gas oil); therefore the difference in production capacity must become smaller. In other words, the lowering of standards minimizes one of the outstanding factors which normally would tend to limit the use of the synthetic hydrocarbon process in gas manufacture—that is, the reduction in gas-making capacity.

Table 1 shows the composition and specific gravity of blue gas and methanated gas, and the yield of the latter from the former. A comparison of the gases made according to equations 1 and 2 shows that it is possible to make a gas of low or high specific gravity, one containing H_2 with substantially 0 per cent CO, and vice versa; or a gas containing appreciable amounts of both H_2 and CO. This is an important relation and may be of particular significance to gas companies making mixed gas; it affords a means of controlling the specific gravity of the gas when changes in the relative proportions of the components of mixed gases are necessary.

The thermal efficiency of conversion of water gas into a richer gas by virtue of reactions typified by equations 1 and 2 are also shown in Table 1. The values given are calculated and based upon the relation between the calorific values (high values) of the original water gas and of the synthesized gas. It appears that a 500-B.t.u enriched gas can be made with a thermal efficiency of conversion approximately equal to 86 per cent. Normally the efficiency will be increased by a lowering of the calorific standard, and vice versa, since less of the synthetic hydrocarbons are required to enrich water gas to the lower heating values.

Table 2 shows the relation between the total cost of purified water gas and the minimum cost (materials only) of methanated gas. The actual cost of the latter will be the amount indicated in the table plus the cost of processing and plus certain fixed charges which can not yet be evaluated.

Summary and Conclusions

A review of the published results of various investigators who have studied the conditions under which hydrocarbons can be synthesized from CO and H_2 indicates that sufficient data are not available for making accurate calculations of the usefulness of such a process in making city gas. The need for further research is indicated; the following questions are asked in order to bring out this fact:

Purification. Sulphur compounds poison the catalysts which have been proposed for the synthesis of hydrocarbons. Accordingly one might ask: What process is suggested for removing the traces of sulphur from water gas? What apparatus and materials are required? Can the process be made self-sustaining by the recovery of sulphur? Will it be an advantage to use coal or is coke preferred as generator fuel? What will be the cost of purifying water gas if the process is not self-sustained? What means are suggested for removing the CO_2 from the reaction products in making enriched gas? Can the CO_2 thus recovered be used in the production of a product from which a credit can be realized? For example, can it be economically converted into formaldehyde by chemical reactions?

Catalysts. Catalysts suitable for laboratory tests are apt to be too soft for use in large-scale operations. It is essential that answers be given to the following questions: What catalysts are best adapted for hydrocarbon synthesis on a commercial basis? In what manner should such catalysts be prepared and what kind of equipment is necessary? What will be the life of a catalyst under conditions that will probably obtain in gas-works practice? Is it possible to produce a catalyst that will not readily be poisoned by sulphur compounds? Can a catalyst when once poisoned, overheated, or otherwise deteriorated, be revivified or again converted into an active catalyst? How should this be done? Will a catalyst prepared on a large scale be as active as that prepared in the laboratory? If not, how much allowance must be made for this variable? How can the temperature of the catalyst be kept within the optimum working range with large-scale production? In other words, how should a reaction chamber be designed?

Operation and Costs. A desirable operating procedure for a gas plant would include the production of enriched water gas (enriched by synthetic hydro-carbons) in amounts equal to the demand for gas, using the off-peak water gas for the production of condensable hydrocarbons which can be used as solvents, motor fuel, or stored for future use for enriching gas without the deposition of carbon—without its complete cracking. We want to know what is the best method of accomplishing this result and what kind of equipment should be used. To what extent is it possible to make condensable hydrocarbons without simultaneously making large volumes of fixed gases? What developed method is preferred and satisfactory for condensing and recovering the liquid hydrocarbons? Is it possible to convert a large percentage of water gas into hydrocarbons which can be readily stored and subsequently used for enriching gas by cracking without the deposition of carbon. If so, what products can be thus used, and by what method can they be thus cracked? What appartus is required? What yield of such hydrocarbons can one obtain from water gas?

By conducting experiments on a larger scale the research chemist probably can obtain the information which the engineer needs for designing equipment and computing results. Not until this is done can accurate estimates be made relating to the cost of operation, the costs of equipment, buildings, and ground, and the economy which may result from the use of a hydrocarbon-synthesis process in enriching gas.

The process for the synthesis of hydrocarbons at atmospheric pressure by virtue of metal catalysts is not yet clearly indicated as the solution to the problem of finding an enricher for lean gas. Unless a more satisfactory catalyst is found, one not readily poisoned by sulphur compounds, it may develop that a process employing higher pressures and oxide catalysts will be most satisfactory.

REFERENCES

[1] Elworthy, H. S., Process of manufacturing gas; U. S. Patent 738,303, Sept. 8, 1903.

[2] Haslam, R. T., and Forest, H. O., Methan by Catalysis from CO in Blue Water Gas: Publication of the Massachcusetts Institute of Technology, Chemical Engineering Department, Series 94, January, 1924.

Hightower, F. W., and White, A. H., "Synthesis of methane from water gas": Ind. and Eng. Chem., vol. 20, No. 1, Jan., 1928, p. 10.

Fischer, Franz, and Tropsch, Hans, "Composition of products obtained in synthesizing": Brennstoff-Chemie, Jahrg. 9, 1928, pp. 21-24.

Elvins, O. C., "Hydrocarbon synthesis from carbon monoxide and hydrogen": Jour. Soc. Chem. Ind., vol. 46, 1927, p. 475T.

Smith, D. F., Hawk, C. O., and Reynolds, D. A., "The synthesis of higher hydrocarbons from water gas"; published in Ind. Eng. Chem., a contribution presented at the September, 1927, meeting of the Am. Chem. Soc.

Smithe, D. F., Davis, J. D., and Reynolds, D. A., "Synthesis of higher hydrocarbons from water gas": Ind. and Eng. Chem. vol. 20, 1928, p. 462.

[3] Fieldner, A. C., Ernst, F. A., and Brown, R. L., "The use of off-peak gas for methanol synthesis": Proc. Am. Gas Assoc., 1927, p. 1031

[4] Odell, W. W., The Carburetion of Combustible Gas with Butane and Propane-Butane Mixtures, with Particular Reference to the Carburetion of Water Gas: Rept. of Investigations, Bureau of Mines, Serial 2840, 1927, 12 pp.

[5] Frey, F. E., and Smith, D. F., "Thermal decomposition of ethane, ethylene, propane, and propylene": Ind. and Eng. Chem., vol. 20, No. 9, Sept., 1928, p. 948.

W. J. Hinchey Now With Missouri-Kansas Co.

W. J. HINCHEY, general superintendent of the Gas Service Company, with headquarters in Kansas City, Missouri, has resigned that position to become vice-president in charge of new properties for the Missouri Kansas Pipe Line Company. This company is rapidly developing its holdings in Missouri, Kansas, Oklahoma and Kentucky. Headquarters offices of the company are also in Kansas City.

W. J. Hinchey

Mr. Hinchey is well known in the gas industry, having been connected with the United Natural Gas Company of Bradford, Pennsylvania, for a number of years, holdinig various positions and working his way up in the organization.

In 1908 Mr. Hinchey joined the ranks of the Kansas Natural Gas Company of Kansas City. In 1923 he was made general superintendent of the Union Public Service Company, which was later purchased by the Henry L. Doherty Company, and operated under the management of the Gas Service Company.

Mr. Hinchey terminated his service with the Gas Service Company on March 1, 1929, and on that date became affiliated with the Missouri-Kansas Pipe Line Company.

SALT LAKE TO HAVE NATURAL GAS FOR WINTER SERVICE

Salt Lake City may expect to have gas by the first of September, according to a recent announcement made by officials of the Western Public Service Corporation, which is carrying the project through to completion.

Construction of the line from Baxter Basin, Wyoming, to Salt Lake City, which was delayed during February on account of heavy snow storms, has been resumed at full pace, and will be rushed to give service for domestic and industrial use for the winter load.

MANZANOLA, COLO., TO HAVE NATURAL GAS

Manzanola, Colorado, will receive natural gas from an extension of the La Junta line. A shipment of 15 carloads of pipe for the work has been unloaded at Manzanola.

Soap +hot water =cleanliness

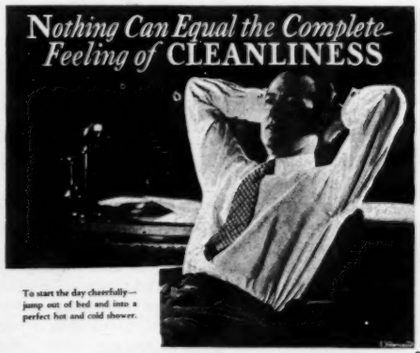
Simple as A B C. Taught in the grade schools, this easy lesson in cleanliness. Yet it's not so easy to GET hot water in many homes that have no MODERN WATER HEATER.

A modern water heater is AUTOMATIC. It gives clean, rust-free hot water for the lowest cost per gallon. There is no waiting. The heater is large enough to supply water for the laundry, the dishes or the bathing without running short. It gives long years of faithful service—silently, efficiently. Remove it—what an inconvenience.

We recommend a number of Automatic Gas Water Heaters that are well made and KNOWN by us to be good. These heaters are also sold by the reliable local dealers.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed by Californians

Nothing Can Equal the Complete Feeling of CLEANLINESS



To start the day cheerfully—jump out of bed and into a perfect hot and cold shower.

WOULDN'T it be a wonderful convenience to always have plentiful hot water immediately, when you first get up in the morning?

Men like their clubs and the hotels for just this reason.

And every one can have this excellent hot water service in their own homes.

An Automatic Gas Water Heater gives plentiful hot water day and night—deep hot water for bathing, a basinful for shaving. There's no waiting, no bother.

The operating cost of an automatic water heater is low. It raises the temperature of water from 60 degrees to 140 degrees at a cost of about one-fifth of a cent per gallon. This is the lowest cost for heating water in the home.

Details for replacing your old water heater with a modern Automatic can be obtained from our office or the local dealers.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed by Californians

BUSY HANDS

They need washing—OFTEN

Busy hands fly from one task to another all day long. Keep them clean and beautiful by frequent washings in gas-heated water.

Let this magic service make housework many times easier and quicker—let it save the precious minutes and give you a personal comfort supreme in baths, shampoos and massages—always ready.

Gas-heated water is Automatic. Hot water flows at the turn of the faucet.

Details for replacing your old water heater with a modern Automatic can be obtained from our office or the local dealers.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed by Californians

The Cleanliness Campaign

Here's a campaign that every dealer can tie-in with. It answers the reason why people buy automatic gas water heaters—to keep their house clean, to keep themselves clean.

Stores selling soap, brushes and mops can make up attractive window displays with those items and an automatic gas water heater. For each of these things contributes to general cleanliness.

Here are three of the cleanliness advertisements we're running this month in the newspapers. They will help everyone sell more automatic gas heaters.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians

245 Market Street
SAN FRANCISCO

H. M. CRAWFORD,
General Sales Manager.

Employee Pension Plan *of the* New Orleans Public Service

By DOROTHEA SCHLESINGER
New Orleans Public Service Incorporated

$67,281.41! Quite a neat, sizeable little sum, don't you think? This figure represents the amount paid out during 1928 in pensions to incapacitated employees of the New Orleans Public Service Incorporated.

It is interesting to note, in a glance at the pension system and its wide-spread use, that utilities lead the field. They were, for the most part, the first to adopt this humane and self-protecting policy, and have been advancing in the carrying out of the pension theory more rapidly than possibly any other industry.

The New Orleans Public Service Inc., dispenser of gas, electricity and street railway service in "America's Most Interesting City," has had a pension plan for more than ten years. During 1918 an increasing number of employees, growing old in the service of the company, were forced to suspend actual work for health's sake. Many department heads carried these employees for a time at full wage, and others, whose budgets would not allow such generosity, were forced to let them go. In November, 1919, the present system of pensions was adopted.

At that time there was only one employee, a woman, who met the requirements for a pension. She had served the company continuously for 15 or more years, was incapacitated for work, and was thereby eligible to apply. Application must be made in writing first to a departmental head, and after the approval and authorization of the president and vice-president of the company, to the Pension Committee, now composed of all department heads, who form the judiciary body and whose decision is final in all matters relating to pension problems.

The amount of a pension differs of course, dependent upon the individual. The basis is a sliding scale plan. For each year of actual service, an allowance is made of one and one-half per cent of the fixed average annual pay during the five years preceding retirement. This amount, it is stipulated, must not be less than $300.00 per year, nor over $2,400.00. For example, a man whose monthly income during the five years preceding retirement had been $100.00, or $1,200.00 a year, would receive 37½ per cent of $100.00, or $37.50 per month.

There is no specification in the pension plan for an employee to remain absolutely idle. He may engage in business provided the business is not prejudicial to the interests of the New Orleans Public Service, Inc. Any venture contemplated, however, must be sanctioned by the director of pensions. Many of the present pensioners in fact do not live in New Orleans, but have moved to small towns near the city, and on the adjoining Gulf Coast.

Since the pension plan was inaugurated 10 years ago, there have been almost 200 people actually coming under its benefits. At the present time, there are 125 on the current pension list. In 10 years time only 37½ per cent of those pensioned at the beginning of the plan have died. This is really remarkable, when one considers that the average pensioner is well into his sixties. One might almost claim longer life once admitted to the pension roll!

Of this number who for the past 10 years have been coming regularly to the office of the director of pensions for their semi-monthly checks, there has not been one man who takes his pension for granted; not one man out of 200 who thinks the company owes him a monthly sum! All of them look upon the pension system as a blessing, something above and beyond what they had any right to expect. As proof of the gratitude and loyalty manifested there is the incident, which occurred several years ago, when a street car strike was threatened. Almost to a man, those of the pensioners who had formerly been conductors and motormen, volunteered to go on the cars immediately, if needed.

When the pension plan was first started, details were handled for a time by that member of the committee who had been designated as secretary. This soon became impractical, however, as the list of pensioners grew, and the workings of the plan became standardized. Just about this time the New Orleans Public Service Inc., entered into a group insurance plan (issuing to every employee free insurance), and it became expedient for the two plans to be linked together into one department. This department, which has been in existence since 1923, known as the Pensions and Insurance Department, employs, in addition to the director, five other persons. This department also takes care of welfare work, maintining a special loan service for employees, with no interest charges. A special nursing service in co-operation with the insurance company is also maintained for workmen and their families.

All of these benefits enjoyed by the employees are totally non-contributory; the expense is borne wholly by the New Orleans Public Service Inc.,—$67,281.41! Quite a neat, sizeable little sum, representing merely one year's accumulation of pension benefits paid out to 125 former employees.

MONTANA-DAKOTA POWER CO. PLANS $4,000,000 LINE

Announcement was made late in February of plans for the construction of a natural gas pipeline from the Cabin creek field near Baker, Montana, to Bismark, North Dakota, by the Montana-Dakota Power Company. This project, if completed, will cost approximately $4,000,000. The Montana press is of the opinion that this line will be a link in the major system between Minnesota and and the Montana gas fields.

"OLD STOVE ROUNDUP" IS ROPER FEATURE

The advertising department of the George D. Roper Corporation of Rockford, Illinois, has inaugurated an "Old Stove Roundup," as a part of a campaign to increase the sale of modern gas ranges. Dealers desiring to take part in the "Roundup" are supplied with a free mat service, and with details of the campaign. Old stoves are taken in regardless of age or model, and a $10.00 allowance made. Other attractions are the 75-cent down payment and easy monthly payments.

Oklahoma Utilities Hold 11th Annual Session

OKLAHOMA Utilities Association, meeting in the Eleventh Annual Convention on March 12, 13 and 14, at the Huckins Hotel in Oklahoma City, offered a program of unusual interest and wide scope, with representatives from all the various divisions taking active part.

At the first general session, members were welcomed to the city by the Honorable Walter C. Dean, Mayor of Oklahoma City. E. F. McKay, manager of the Oklahoma Utilities Association, presented his annual report at this session, and the meeting closed with an address by Martin J. Insull, president of the Middle West Utilities Company, on "Financing Public Utilities."

Halford Erickson, vice-president in charge of operation of the Byllesby Engineering & Management Corporation with headquarters in Chicago, was to have given a talk on "Facts Relating to Group Operation of Public Utilities" at the morning session of March 13, but was unavoidably detained.

Officers elected by the Association during the general session to serve for the following year include: for president, Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation of Tulsa; for first vice-president, T. H. Steffens, president of the Sand Springs Railway Company of Sand Springs; for second vice-president, S. I. McElhoes, vice-president of the Southwestern Light and Power Company of Oklahoma City; for treasurer, W. R. Emerson, secretary-treasurer of the Oklahoma Gas and Electric Company of Oklahoma City; for manager, Edward F. McKay, of Oklahoma City. The Gas Division will be represented on the executive board by E. C. Joullian of the Consolidated Gas Utilities Company of Oklahoma City.

Meetings of the various utilities were held on Tuesday and Wednesday, March 12 and 13, the Gas Division holding sessions on both those days. Following is the program offered by that Division:

TUESDAY, MARCH 12—(AFTERNOON)

Presiding—R. W. Hendee, Chairman

Greetings from Natural Gas Department, A.G.A., E. J. Stephany, Pittsburgh, Penn., secretary.

"The Southwestern Gas Metermen's Short Course," F. D. Frank, Bartlesville, chairman, general committee.

"Main Line Domestic Meters," A. J. Kerr, Tulsa, district manager, Pittsburgh Equitable Meter Company.

"Gas Company Advertising," R. S. McBeth, Tulsa, advertising manager, Oklahoma Natural Gas Corporation.

"A.G.A. Accounting Section Activities," Fred Karr, Kansas City, director public relations, Gas Service Company.

WEDNESDAY, MARCH 13—(AFTERNOON)

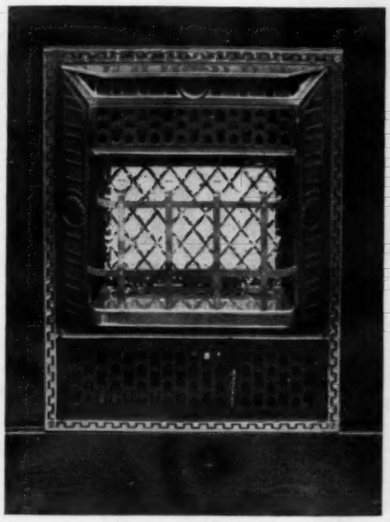
Presiding—R. W. Hendee, Chairman

"Results of Sales Activities in Natural Gas Utilities," F. M. Rosenkrans, Kansas City, new business manager, Gas Service Company.

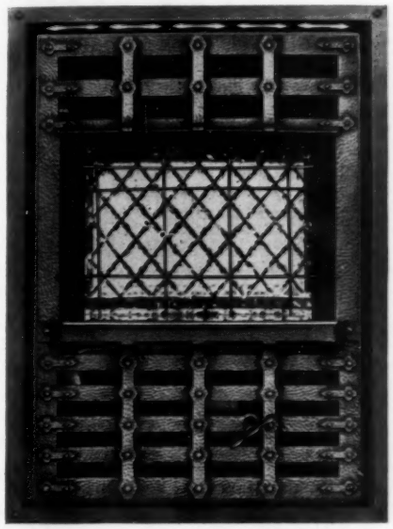
"Developments in Gas Refrigeration," J. W. Duvall, Oklahoma City, gas engineer, Oklahoma Natural Gas Corporation.

"Relation of Barometric Conditions to Natural Gas Density," R. H. Locke, Ch. E., Oklahoma City, president, Chemical Service Corporation.

Now! Wall Heaters with A. G. A. Approval



The latest addition to the "Pacific" line of Gas Heating Equipment are the new Models 7, and 8-A Wall Heaters. These beautiful new Heaters have been thoroughly tested by the laboratory of the American Gas Association, and they now bear the "Blue Star" stamp of approval. They are equipped with the Multi-tubular burner which has proven so popular and efficient in other "Pacific" products. The attractive appearance and sturdy construction coupled with its efficiency in rendering cheerful heat will prove a quick seller and should be displayed on your sales floor.

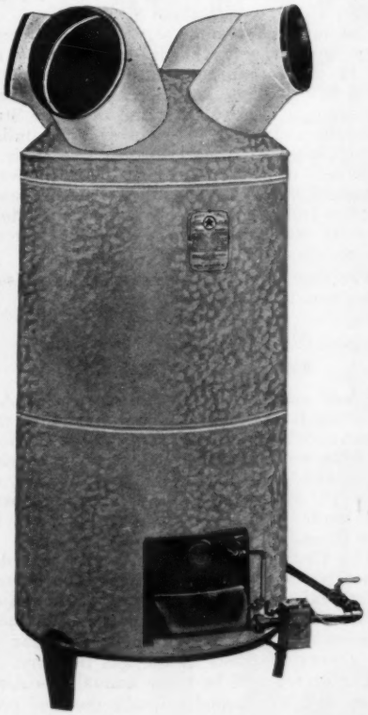


The Multi-Tubular Burner

Each burner has its independent injection of gas. Primary air for combustion is directly siphoned at each individual burner. There is no need for adjusting of the gas and air for combustion, as this new Pacific Burner is scientifically designed to automatically give the correct proportion of air to gas. This results in complete combustion and a high temperature flame of proven economy. No soot. No odors.

By Selling the Complete Pacific Line You Have the Advantage

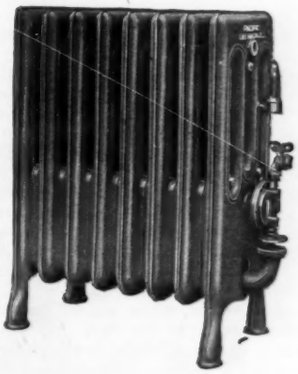
Because with the complete Pacific line you can offer the correct solution to every heating problem. Where other heating salesmen stress their particular appliance, our agent selects from a full line the appliance best suited. We have a real money making proposition. Write for particulars.



A. G. A. approved Unit Furnace

The Pacific Furnace, with the recognized advantages of the "round" design, eliminates all corners and dead air spaces. It promotes better circulation, giving an abundance of heat more quickly. The heating element is completely welded throughout, is gas tight, and permits no combustion fumes to escape. The heating unit is of 20-gauge pure Ingot Iron metal.

"Pacific" Unvented Gas Steam Radiators



The Pacific Unvented Gas Steam Radiators are now available in four column pattern. A size for every demand, 26, 32, and 38 inches high. The Pacific Gas Steam Radiator has been passed and approved by both the laboratory of the American Gas Association and the Underwriters Laboratories as well.

Our agency proposition is very attractive—write for particulars concerning your locality.

Get in on Every Heating Job in Your Territory

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Manufacturers of Every Type of Gas Heating Appliances

Roseberry and Walter Streets, Huntington Park, California

Sixth Annual Gas Meter Short Course Due *at* Norman, Okla., April 16-18

THE Sixth Annual Southwestern Gas Meter Short Course, conducted by the College of Engineering, University of Oklahoma, assisted by the Oklahoma Corporation Commission and the Oklahoma Utilities Association, will be held at Norman, Oklahoma, April 16, 17 and 18. Attendance is expected to exceed 300.

F. D. Frank

The course has been arranged to cover a broader scope of subjects than previous courses, including fundamental and more advanced instruction. The first and third mornings will be devoted to general sessions for all of those attending the school. The second morning will be divided into advanced and fundamental sessions. Classes will include addresses, discussions, shop practice and demonsrations. Among subjects to be presented in general sessions are: "Early Developments of Orifice Meter Measurements"; "Recent Developments in Gas Measurements"; Motion Pictures; "Shooting Oil and Gas Well Fires"; "Meter Proving and Adjusting"; Meter Records; and "Report of Approved Methods Committee."

Shop Practice will include proving and adjusting domestic meters; assembling and adjusting high and low pressure regulators, orifice meters and large capacity positive meters and also gravity test of Norman gas. Many other technical matters will be presented and demonstrated in afternoon sessions.

Several leading gas equipment manufacturers will have exhibits at the short course and will assist in furnishing equipment and instruction. F. D. Frank, of the Empire Companies at Bartlesville, is chairman of the general committee which has charge of the short course. Other members are: D. A. Sillers, Lone Stare Gas Co., Dallas; W. H. Carson, Oklahoma University, Norman; C. B. Day, Consolidated Gas Utilities Co., Oklahoma City; F. C. Walters, Oklahoma Natural Gas Corp., Tulsa; C. W. Robbins, Consolidated Gas Utilities Co., Blackwell; E. F. McKay, Manager Oklahoma Utilities Association, Oklahoma City; E. A. Clark, Oklahoma Natural Gas Corp., Tulsa; B. P. Stockwell, Oklahoma Utilities Co., Bristow; D. C. Williams, Kay County Gas Co., Ponca City; R. H. Lussky, Oklahoma Corporation Commission, Oklahoma City; G. P. Bunn, Phillips Petroleum Co., Bartlesville; A. J. Kerr, Pittsburgh Equitable Meter Co., Tulsa; S. J. Fraser, Prairie Oil and Gas Co., Independence, Kansas.

A January Water Heater Campaign

(Continued from Page 25)

only gas appliance whose benefits can be shown by a single simple picture. Smaller advertisements, 3 column by 7 inches and 2 column by five inches, stressed hot water satisfaction, but did not use the faucet illustration.

Newspaper advertising was reinforced by window displays wherever possible. At the Los Angeles office the special trim illustrated above was used and proved very effective. This consisted of three panels, the center one of which used the same motif as the larger newspaper advertisements—a huge faucet, with a stream of running water in proportion, and clouds of billowing steam. The two side panels were of a more decorative character, and showed snow-capped mountains in the background with a mountain lake in the foreground. The three panels together suggested the origin and one use of water, while one of the showcards called attention to the fact that the service of water in the modern home is incomplete without an instantly available supply of hot water, such as is furnished by the automatic storage gas water heater. In the smaller offices attractive floor display cards furnished by one of the manufacturers made an effective showing.

Conservative quotas, totaling 100 heaters, were set for the Divisions at the beginning of the campaign in order that each might have a definite objective in view. These quotas were exceeded in every instance, and by the end of the month a total of 256 had been sold. The contest resulted not only in keen competition among the salesmen in each Division, but also between the Divisions themselves, the leading Division winning over the next highest by a margin of six heaters. The four winning salesmen sold 31, 23, 15 and 16 heaters, with scores of 59, 48, 34 and 33 points, respectively.

A summary of sales shows that eighty-eight 15-gallon, one hundred thirty-eight 20-gallon, twenty-four 30-gallon and six 45-gallon heaters were sold. This was considered very satisfactory, not only as to total number but also as to the relative numbers of each size sold. Past experience has shown a tendency on the part of salesmen to sell a 15-gallon heater when conditions demand the installation of a 20-gallon, and the sale during the month of over one and a half times as many 20 as 15-gallon heaters is very good.

After deducting commissions, stores expense and delivery charges, but not overhead charges, the sale of these 256 heaters resulted in a profit of over $5,000. The increased revenue from them is estimated at $3,500 per year, and when it is considered that this income will probably be maintained for 10 years or more, the value of a water heater campaign from the gas company's standpoint can be readily appreciated. At the same time, the customer is satisfied to pay a somewhat higher gas bill each month on account of the greater service rendered by the automatic type of water heater.

The fundamental practice of good salesmanship—stressing the benefits to be derived from an appliance rather than details of construction—is never so essential as in a campaign, and particularly one in which water heaters are featured. Time is limited, and the quickest way to make sales is to show the prospect what an instantly available supply of hot water will mean to her and her family in convenience, cleanliness, comfort and health. The individual uses of hot water are almost numberless, and in almost every instance there are some which will appeal more than others, and which, if skillfully emphasized, will close the sale. Every gas appliance salesman should study water heater selling thoroughly, for it can be made one of the most profitable of his activities, both to himself and to him company.

NEW 20-INCH PIPELINE TO SERVE FT. WORTH AND DALLAS

Construction of a 20-inch pipeline from Petrolia, Texas, to Fort Worth and Dallas, Texas, will be started soon, according to a report by L. B. Denning, president of the Lone Star Gas Company, of Dallas. The proposed line will have a daily capacity of about 100,000 M.c.f. of gas, and will be 135 miles in length. It will give the Lone Star Gas Company four trunk lines into Fort Worth and Dallas, from fields of Oklahoma and Texas, and will supplement the supply to Waco, Temple, Georgetown, Corsicana, Cleburne, College Station, Waxahachie, and a number of other towns.

In pioneering natural gas transmission in the southwest, the Lone Star Gas Company built its first line in 1910 from the Petrolia field, Clay County, Texas, to Fort Worth, Texas, a distance of about 90 miles.

The total population served by the company in 1910 was a little over 79,000. In the 18 years that have elapsed since then, Forth Worth alone has increased more than 150 per cent in population and the Lone Star Company today comprises over 3,200 miles of pipelines, 20 compressor stations with a combined capacity of 33,000 horse power, serves 200,000 domestic customers and draws supplies from 21 fields with a total open flow capacity well above a billion cubic feet of gas per day.

The company now serves over 220 cities and about 1,500 industrial plants.

NAMES FOR MUNROE AWARD REQUESTED BY A.G.A.

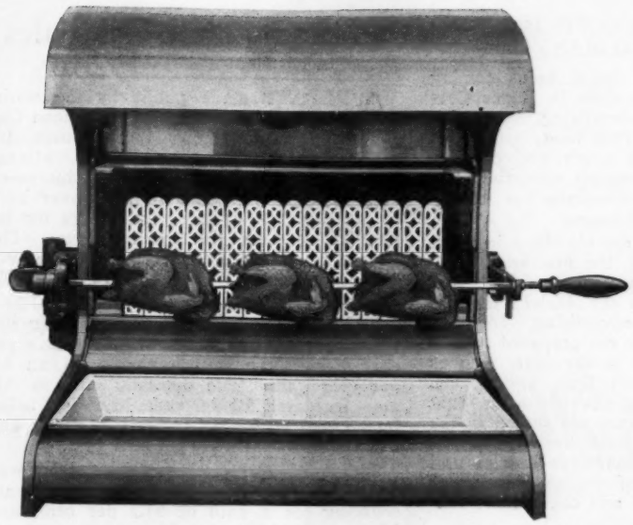
Every member of the American Gas Association is invited to submit names to the Association's executive board for the Charles A. Munroe Award for outstanding service performed during the year July 1, 1928, to June 30, 1929, according to announcement just made by Association Headquarters in New York.

The Charles A. Munroe Award provides annually for the financial recognition of any individual who, in the opinion of the Association's Executive Board, has made the most outstanding contribution during the year in the general interests of the gas industry.

The award will be made annually without lapse, and it is hoped to make the first presentation at the Association's eleventh annual convention and exhibition at Atlantic City, N. J., October 14-18, 1929.

J. H. KERR SPENDS MARCH ON PACIFIC COAST

J. H. Kerr, president of the Cleveland Gas Burner Company of Cleveland, Ohio, spent the month of March on the Pacific Coast.



The barbecue Rotisserie shown is Number 210. No. 310 is the enclosed oven type.

Shouldering Out Solid Fuel

Looking at it one way, the Humphrey Rotisserie is more than a piece of hotel or restaurant equipment. It might be considered the advance guard in the march of gas-fired equipment to replace solid fuel.

By means of the Rotisserie, short order emergency service can be handled without maintaining the present necessary day fires. It turns out perfectly grilled meat, fowl or fish, and is ready to start the order at the strike of a match.

All this means something to the Chef. And it can be made to mean more to the gas industry. For once the full convenience and economy of gas is appreciated,—once the Chef appreciates the work of the Rotisserie as compared to his old charcoal or coal grill fire, the sales resistance against a complete kitchen change-over to gas is materially lessened.

Salesmen find that a little extra effort on the Rotisserie pays a good dividend around the end of the month. Some good sales tips, talking in terms of kitchens, are available to anyone else who would like to build up his income with this non-competitive merchandise.

The HUMPHREY Rotisserie

Pacific Coast Manager
C. B. Babcock
135 Bluxome St.
San Francisco

Manufactured by
General Gas Light Co.
Kalamazoo, Mich.

P. G. *and* E. Now Waging Two Sales Campaigns

AS PART of its 1929 sales activities, the Pacific and Electric Company is at the present time conducting two intensive sales campaigns in practically all its territory outside the San Francisco Bay area. A gas range campaign is under way in all the districts except Sacramento, Stockton, and San Jose. Since the range business in the last three cities has been left in the hands of the dealers, the gas company is running a campaign on automatic water heaters in that district.

Both campaigns are scheduled to run from March 1 to May 1. Twenty men on ranges, with a quota of 700 to sell, are already one-half through their quota at the end of the first three weeks. Fifteen men selling automatic water heaters, with a quota of 500 installations, had sold 210 at the end of the first three weeks. Newspaper advertising, window displays, and envelope stuffers are all being utilized.

One outstanding feature of the water heater campaign is that in every advertisement are included words to the effect that "these heaters are also sold by the reliable local dealers." Automatic gas water heaters are being installed in the homes for $5.00 down and included with each heater sold during the sale is a Cannon bath towel set of $10.00 value, consisting of two large bath towels, four wash cloths and one bath mat.

ST. JOSEPH GAS COMPANY ELECTS OFFICERS

At a meeting of the officers of the St. Joseph Gas Company, held in St. Joseph, Missouri, Monday, March 11, Fred Karr was elected general manager of the company, and will be located permanently in St. Joseph.

The new board of directors and officers of the Company were elected at a joint meeting with the members of the retiring board. B. C. Adams was elected president of the Company; W. A. P. McDonald, manager of the St. Joseph Clearing House Association, vice-president; R. D. Garver, vice-president; Harry Warner, secretary-treasurer; J. R. Abercrombie, assistant secretary-treasurer; E. E. McWhiney, assistant secretary; C. B. Wedum, assistant secretary; T. A. Wallace, assistant treasurer.

Members of the new board of directors are as follows: Judge C. H. Mayer, F. R. Coates, H. O. Caster, W. A. Jones, Mr. Adams, W. A. P. McDonald, Fred Karr, Judge Garver, and Harry Warner. Retiring members are: Milton Tootle, Jr., Mr. Brown, Mr. Cutcheon, R. R. Clark, T. L. Ritchey, Henry Krug, Jr., I. A. Vant and F. R. Castle.

EL CAJON, CALIF. MAY BE SUPPLIED WITH GAS FROM SAN DIEGO

A survey of prospective gas patrons in El Cajon, California, was made recently by representatives of the San Diego Consolidated Gas and Electric Company of San Diego, California. The Chamber of Commerce in El Cajon is arranging with several firms to display gas appliances for demonstration purposes.

TURLOCK GAS CO. REPORTS GOOD BUSINESS YEAR

Turlock Gas Company of Turlock, California, reports an increase in operating revenue during the past year, with $48,741.58 revenue in 1928 against $46,216.42 for 1927.

GEO. D. ROPER CORP. ISSUES ADVERTISING MANUAL

One of the recent dealer helps coming from the offices of the Geo. D. Roper Corporation is the new advertising manual on Roper Gas Ranges. This book, printed in 9x12-inch size, has 68 pages and contains over 100 complete newspaper advertisements and suggestions for campaigns for use by dealers selling Roper Ranges.

The advertisements are classified in three sections in the manual, the first section being given over to reproductions of mats and electrotypes for use in the dealer's day-by-day or week-by-week advertising. Included in this section are many ads prepared for use during special seasons of the year, such as Moving Day, Mother's Day, Spring, etc. Special sales campaign advertisements, that have been sales producers are shown in the second section. The final section explains the Roper mat and electrotype service and contains illustrations of the various Roper Gas Range mechanical and convenience features.

GAS REFRIGERATOR SALESMEN SUPPORT SALES COURSE

The first school for training in gas refrigeration salesmanship on the Pacific Coast was held during the closing days of March, in Los Angeles.

A. L. Spring, district manager for the wholesale branch of Servel, Incorporated, cooperating with sales executives of the Southern California Gas Company and the Southern Counties Gas Company, conducted the school on March 26, 27 and 28, with some 40 salesmen attending.

Servel representatives explained in detail the construction of the gas refrigeration unit, and different phases of refrigeration manufacture. Mr. Spring gave instruction in salesmanship, with the cooperation of Clyde H. Potter, chief commercial agent of the Southern Counties Gas Company, and J. E. Kern, refrigerating engineer for the Southern California Gas Company.

NEW BULLETIN ON SQUARE EDGED ORIFICES OUT

A bulletin has recently been published by the Department of Commerce on the "Discharge Coefficients of Square Edged Orifices for Measuring the Flow of Air," by H. S. Bean, associate physicist, E. Buckingham, physicist, and P. S. Murphy, assistant physicist, of the Bureau of Standards. It may be obtained at the price of 20 cents by writing the superintendent of documents, U. S. Government Printing Office, at Washington, D. C.

CANON GAS CO. BOUGHT BY SMITH LANDERYOU CO.

Smith Landeryou Company of Omaha, Nebraska, recently purchased the Canon Gas Company at Canon City, Colorado. E. G. Jones will be president and general manager of the new company, which will be reorganized. Mr. Jones was formerly general manager of the Greeley gas plant at Greeley, Colorado.

CITIES SERVICE CO. HAS NEW LINE TO NEOSHO, MO.

The 15-mile pipeline being laid by the Cities Service Gas Company from Saginaw, Missouri, to Neosho, is expected to be completed about April 15, according to announcement. The laying of the distribution system in Neosho has practically been completed.

Manufactured Gas Sales Increase in 1928

A REPORT made public by the statistical department of the American Gas Association shows that Illinois, Indiana, Iowa, Michigan, Missouri, Minnesota, and Wisconsin, as a group, increased manufactured gas sales in 1928 over 1927 by 8.1 per cent, or more than twice the industry's increase the country over. The figures are 131,785,200,000 cubic feet in 1927 and 142,511,300,000 cubic feet in 1928, a gain of 10,726,100,000 cubic feet.

The best showing in the middle west group was made by Michigan, with an 11.3 per cent gain. Illinois was next, with an 8.5 per cent gain. The domestic sales in this area increased 5.2 per cent, Michigan being in the lead with a 9.1 per cent advance, and Illinois next with a 4.4 per cent gain.

Industrial and commercial sales showed an increase of 13.2 per cent, Minnesota accounting for a gain of 31.7 per cent, and Michigan and Illinois with more than 14 per cent each.

The most striking change was in the field of house heating, Indiana running up an increase of 242.7 per cent; Michigan, 105.2 per cent; Wisconsin, 87.8 per cent; Illinois, 35.5 per cent and Missouri, 53.3 per cent.

SAN ANTONIO DISTRICT TO HAVE GAS FROM REFUGIO FIELD

According to a recent dispatch from the oil and gas division of the Texas State Railroad Commission, plans are being made for the supplying of natural gas for a number of towns and industries in the San Antonio district from the Refugio fields. Houston Gulf Gas Company, a subsidiary of the United Gas company, a Moody-Seagraves interest, is the company asking the franchise.

The line will be 106 miles long and will be of 16-inch pipe, to be constructed by the United Gas Engineering Corporation, a Moody Seagraves interest. Along the route the line will serve Karnes City, Kennedy, Floresville, Poth, Falls City, Elmendorf and Saspamco. Approximately $2,750,000 will be spent on the project when arrangements have been completed. The Southwest Distributing Company, a subsidiary of the United Gas Company, will have charge of the distribution.

DEER LODGE, MONTANA, MAY SOON HAVE NATURAL GAS

Natural gas will be available for residents of Deer Lodge, Montana, if the application of Frank Conley for the privilege of serving that community is granted. The term of the proposed franchise is 20 years. Gas will be piped from the Shelby field, according to late announcements.

R. W. COBLENTZ NOW WITH WASH. GAS AND ELECTRIC CO.

R. W. Coblentz, formerly of the Portland Gas and Coke Company, has joined the staff of the Washington Gas and Electric Company as new business manager to replace H. E. Seagraves who resigned recently.

K. L. SIMONS. V. P. OF TEXAS CITIES CO. RESIGNS POST

K. L. Simons, vice-president of the Texas Cities Gas Company, tendered his resignation on March 13, to become effective as soon as a successor is named. Mr. Simons was for 16 years manager of the El Paso Gas Company.

A GRAND SLAM for January 1929

WE plead guilty. We know that an organization of our size—with our international connections—should announce this wonderful news with appropriate dignity,—lots of staid looking type and conventional ornaments. But today we just cannot do it. When—after putting lots of good work behind a good product, January sales come right back labeled "One hundred per cent increase over January, 1928"—we simply must permit a little justified enthusiasm to our Gas Water Heater Department.

To you—the event is scarcely of lesser importance because Welsbach Self Action Water Heaters can help increase your sales, too.

All Welsbach Water Heaters may be had with or without safety gas shut-off and temperature-pressure relief valve.

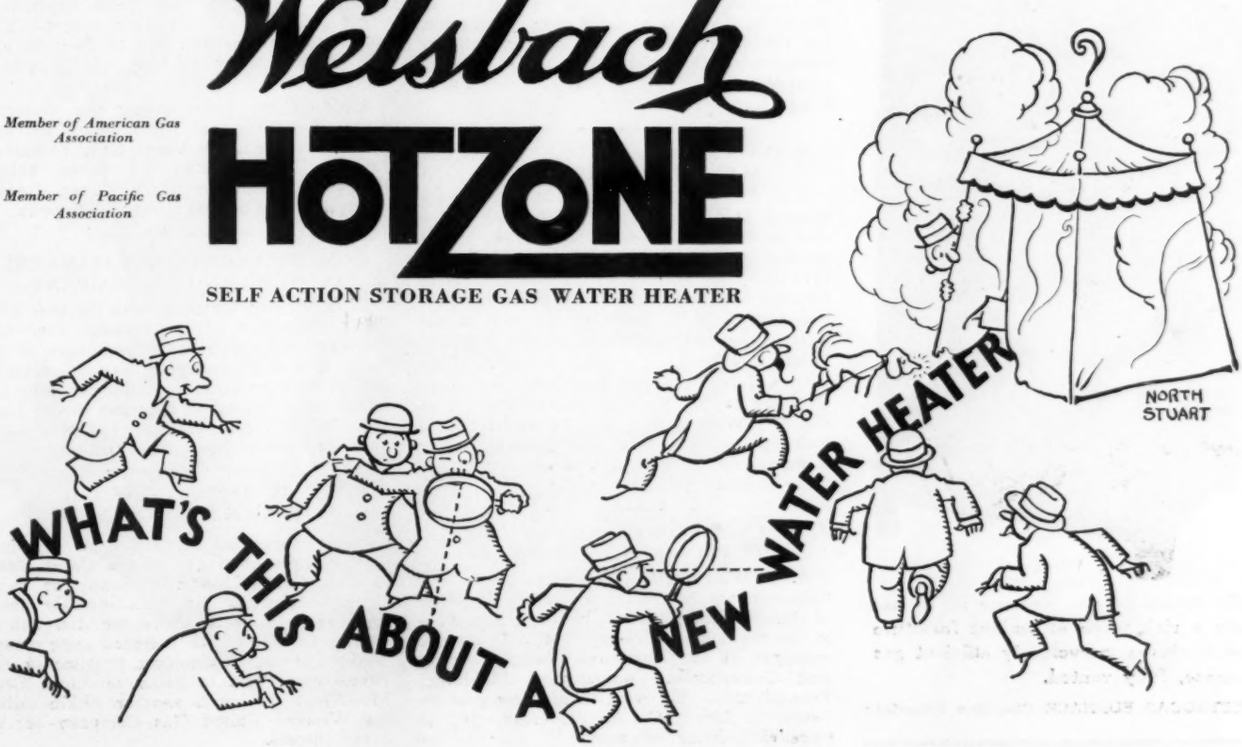
WELSBACH COMPANY, Gloucester City, N. J.

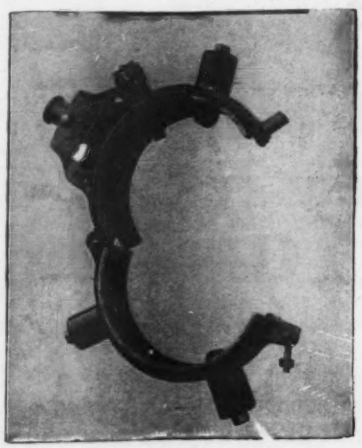
Member of American Gas Association

Member of Pacific Gas Association

Welsbach HOTZONE

SELF ACTION STORAGE GAS WATER HEATER





The STRICKLER

Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.

1475 Oak Street Columbus, Ohio

The Electrogas Cabinet

Will appeal to you because it is not only a rich piece of walnut furniture but is also a marvelously efficient gas furnace, fully vented.

ELECTROGAS FURNACE CO., San Francisco

Appliance Society Plans 1929 Gas Range Week

EXTENSIVE plans have just been completed by the Gas Appliance Society of California for the 1929 spring campaign. The campaign proper is to be conducted during the week of April 15-20 and many attractive and interesting features will be included. The sale feature will be an $18 oven heat regulator given away free on ranges priced at $118 or more.

The Society is planning a thorough-going advertising campaign to supplement its members' displays. Street car cards, publicity material including new recipes and general household informative material, together with unduplicated publicity stories to selected newspapers will be furnished.

A very interesting feature of the campaign is the contest between gas appliance dealers for the best window trim and floor displays. This contest is expected to have a pronounced effect on the sales, as attractive prizes are to be given. Dealers are planning to appoint local campaign committees to arouse enthusiasm in their meetings.

Plans are also being formulated by the Society for an automatic water heater campaign to be conducted this summer.

EXTENSIVE DEVELOPMENTS ARE MADE BY WESTERN GAS CO.

Extensive territory in western Kansas is being developed by the Western Gas Company with headquarters in Salina, Kansas. Franchises are being sought in many new towns. Towns included in the development are: LaCrosse, Otis, Olmitz, Bison, Hoisington, Great Bend, Ellinwood, Victoria, Gorham, Walker, Pfeifer, Loretta, Pawnee Rock, Larned, Garfield, Kinsley, Offerle, Spearville, Bucklin, Mullinville, Coldwater, Protection, and Ashland.

Work has been completed on the development in Bison and gas was turned into the mains on March 18. Truman and Smith of El Dorado, Kansas, are the contractors in charge of the work and are completing plans for the distribution work as well as for transmission from the wells. Gas is being secured for the development from fields near Bison, Kansas.

MID-WEST SAFETY CONFERENCE MARCH 19, IN CHICAGO

Over 1,000 delegates attended the Seventh Annual Mid-West Safety Conference which was held in Chicago on March 19, at the Stevens Hotel. This regional council was held under the auspices of the Chicago Safety Council, and was under the general supervision of Paul F. Strickler, director of the territorial councils division of the National Safety Council.

On March 20, the executive committee members of the National Safety Council of the Mid-West section met in conference to make plans for the coming annual Safety Congress to be held in Chicago, September 30 to October 5.

A. V. WADSWORTH NOW VICE-PRES. OF PITTSBURG COMPANY

A. V. Wadsworth, formerly secretary and treasurer of the Westcott Valve Company of East St. Louis, Illinois, has been appointed to the position of vice-president and general manager of the Pittsburgh Valve Foundry and Construction Company of Pittsburg, Pennsylvania. He went to his new post on February 12th. C. A. Anderson, Jr., is president of the company.

Additional Contracts Let *for* P. G. *and* E. Equipment

IN preparation for bring in and distributing natural gas in San Francisco, Oakland and San Jose, the Pacific Gas and Electric Company has let several additional contracts for necessary plant and station equipment to handle the new fuel. Two steam driven boosters with the capacity of 1,000,000 cubic feet per hour each have been ordered for San Francisco, and the same for the Oakland plant. In all three of the cities natural gas will be mixed with the reformed gas through the use of automatic mixing valves. A total of $28,000 is the cost of this equipment. An additional $20,000 is being spent on station meters.

Other plant extensions and remodeling throughout the system include the installation of a 250 H. P. boiler, removing oxide boxes, remodeling of the building at the Stockton plant. At San Rafael, two 250 H.P. boilers are being installed, a 209,000 cubic feet, 60 pound pressure steam driven compressor, a low pressure steam booster and additions to the liquid purification system. Contract has been let for a 500,000 cubic feet holder at Marysville and a 100,000 cubic feet holder at Redding. A new motor driven booster is to be installed at Santa Rosa. At Grass Valley, a steam driven compressor is being installed and the electric switch board apparatus is being completely revamped. A 200,000 cubic foot, high pressure gas holder will also be built in Woodland. Forty thousand dollars is the amount set aside for this purpose.

MONROE AND RICHLAND FIELDS TO SUPPLY SOUTHERN TOWNS

Press reports state that construction of the gas pipeline from the Monroe and Richland fields to Birmingham, Alabama, Atlanta, Georgia, and Chatanooga, Tennessee, will be begun within the next month. The line is expected to be completed by December 31.

The Southern Natural Gas Corporation, backing the project has been capitalized for $35,000,000, it has been stated. The major part of the line will be 24-inch, and will have a daily capacity of 120,000,000 cubic feet.

Some of the towns along the projected route, in addition to Birmingham, Atlanta and Chatanooga, are Yazoo City, Vicksburg, Jackson, Meridian, Tuscaloosa, Selma, Prattsville, Montgomery, Bessemer, Cedartown, Rome, Cartersville and Marietta.

E. A. WILDER NAMED MANAGER OF NEWTON GAS COMPANY

E. A. Wilder, formerly with the new business department of the Kansas City Gas Company, has been named manager of the Newton Gas Company of Newton, Kansas. Mr. Wilder replaced L. L. Garner, who has left to take the post of manager of the Jackson County Light, Heat and Power Company at Independence, Missouri.

VINET IS NAMED NEW BUSINESS MANAGER AT SANTA CRUZ

Pierre Vinet has recently been appointed new business manager of the Coast Counties Gas and Electric Company at Santa Cruz, California. He takes over the duties that were formerly under the direction of Morris F. Wales, who resigned some months ago to go into accounting practice in San Francisco. Prior to going to Santa Cruz, Mr. Vinet was with another Fitkin utility, the Western United Gas Company of Aurora, Illinois.

the best guarantee of

GAS HEATING SATISFACTION

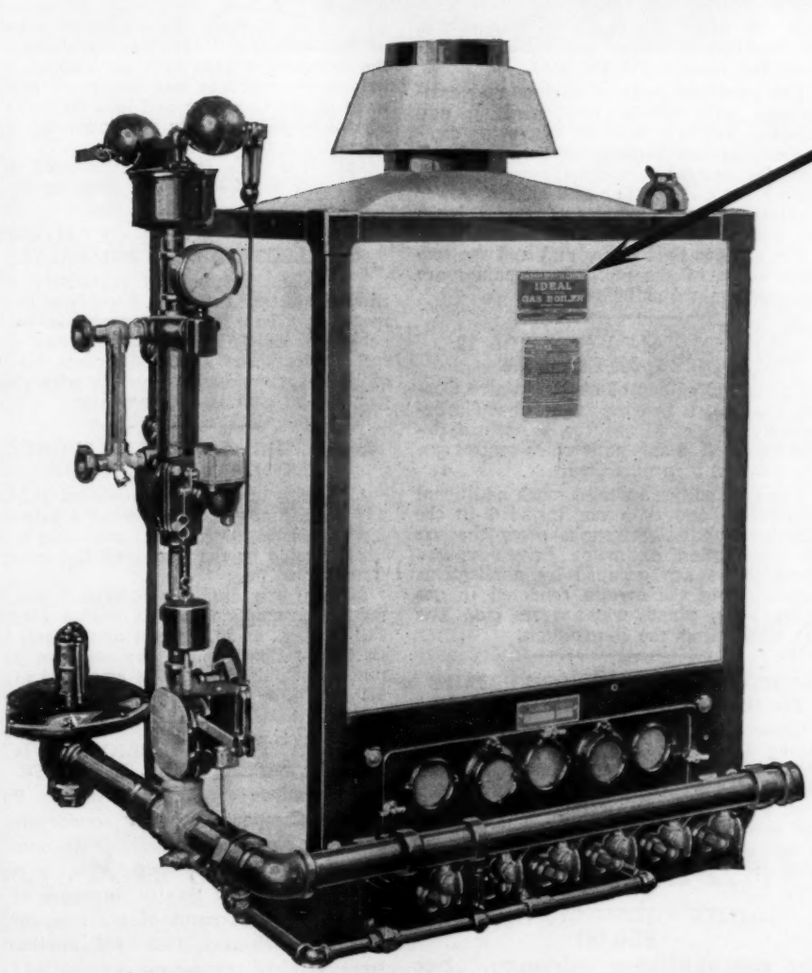
*is the nameplate**

on

IDEAL GAS BOILERS

backed by the prestige of the greatest name in the heating industry

AMERICAN RADIATOR COMPANY



*

Send for full information to

AMERICAN GAS PRODUCTS CORPORATION
376 Lafayette Street
New York

Distributor

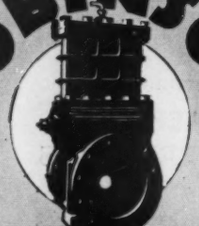
California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.
308 East Eighth Street
Los Angeles
TRinity 0769

ROBINSON



ORIFICE FITTINGS

They eliminate old style by-pass
They save materials
They save time
They save labor
Changing plates is simplified
Orifice is always centered
Frequent inspection is possible
Occupy little space
Make for better metering
No hazards
Cannot leak, etc.

ROBINSON ORIFICE FITTING COMPANY
1435 SANTA FE AVENUE
LOS ANGELES, CALIF., U.S.A.

COOPER AND BESSEMER COMBINE IN NEW CORPORATION

A NEW company, The Cooper-Bessemer Corporation, representing a combination of The C. & G. Cooper Company and The Bessemer Gas Engine Company, was announced late in March. E. J. Fithian, president of The Bessemer Gas Engine Company, will be chairman of the Board, and B. B. Williams, president of The C. & G. Cooper Company, will be president and general manager of the new corporation. The remaining officers will be chosen from the active executives of both companies. There will be practically no change in the personnel of the sales and service organizations.

This combination brings together two of the oldest manufacturers of power machinery in the country. The C. & G. Cooper Company was established 96 years ago at Mt. Vernon, Ohio, by two Cooper brothers, while The Bessemer Gas Engine Company was organized at Grove City, Pennsylvania, more than 30 years ago.

The Cooper Company has for a long time occupied a prominent position in the four-cycle engine industry, especially for compressor service in both the natural gas and oil industries. The Bessemer Company has acquired prominence in the pumping and drilling engine and the two-cycle compressor engine fields and also in the marine and stationary diesel engine fields.

With the combined lines already practically complete it is expected that improvements in engineering and manufacturing can be carried out which will continue to keep the names Cooper and Bessemer in the forefront wherever gas and diesel engines and compressors are used.

The combined lines of engines and compressors will include small drilling and pumping engines, two or four-cycle compressor engines, vertical or horizontal engines for general power purposes, diesel oil engines for oil pipe line and electric power generation to the largest 1500 B.H.P. main line compressor station engines.

The various field offices and and the two home offices of the merged companies are being maintained as before.

MODERN VALVE CONTROL IS SUBJECT OF BOOKLET

The second edition of Modern Valve Control Practice, a booklet issued by Cutler-Hammer, Inc., of Milwaukee, Wisconsin, describing the C-H automatic valve control system, has just been published.

This new edition contains much additional information and data not included in the original book. Photographs show the use and installation of motor driven valves. These views are grouped by applications demonstrating the service rendered in gas plants, power plants, water works, etc. The text supplements the illustrations.

NEW COMPANIES SECURE PERMIT TO SERVE COUNCIL GROVE, KAN.

Chase County Pipeline Company and the Strong City Gas Company have been organized by Council Grove, Kansas, business men headed by Fred Haucke, to bring natural gas to Council Grove. The group has been granted the franchise and agrees to furnish gas by April 15. The supply will come from the Urschel Ranch, north of the city.

$50.00
for gas appliance salesmen. **See page 36.**

NEW SALES FLOOR DISPLAYS FOR SO. COUNTIES DISTRICT OFFICES

A new departure in sales floor displays is being made by Southern Counties Gas Company which has ordered plans drawn for model kitchens for its district offices at Monrovia and Santa Ana, Southern California. The kitchens will occupy a front corner of each office with the street display window forming one wall of the kitchen. In each kitchen a hostess will be on duty all day long serving hot coffee and other light refreshments to all who enter the gas company office. The latest in modern gas equipment for kitchens will be installed and actually working in each model kitchen and the attention of visitors will tactfully be called to this equipment by the hostess and explained by the floor salesman. Offices of the company at Whittier and Santa Monica are to be remodeled at once in order to provide room for model kitchens somewhat similar in character. This series of kitchens is being planned by Ernest Freese. They will be "in color" and each kitchen will be distinctive in that each will have its own particular color scheme. With tiling in color, floors in color, fixtures in color, draperies in color—all attractively blended—these model kitchens are expected to increase materially the interest of women generally in modern gas equipment for domestic use on the Southern Counties lines.

NEW APPOINTMENTS MADE BY FOSHAY COMPANY

L. L. Hill, vice-president of W. B. Foshay Company, and a resident of Minneapolis, Minnesota, has been made general manager of that Company. Mr. Hill has been with the Company a little over six months. His new duties will take him into every department of the Company and into the territory served by public utility and industrial divisions.

Mr. Hill was formerly connected with Page, Hill and Company of Minneapolis.

BRISTOL CO. ISSUES CATALOGUE ON ELECTRIC CONTROL VALVES

The Bristol Company, of Waterbury, Connecticut, manufacturer of Recording instruments, has issued a new catalogue on the subject of Bristol's Automatic Electric Control Valves. The booklet describes this line of Bristol manufacture, together with photographs and charts for illustration.

LOUISIANA GAS FIELDS PRODUCE 232,631,140 M. C. F. IN 1928

Gas fields of Louisiana produced 232,631,140 M. c. f. of gas, representing a gain over 1927 of 51,461,347 M. c. f., according to figures released by the Louisiana Conservation Commission.

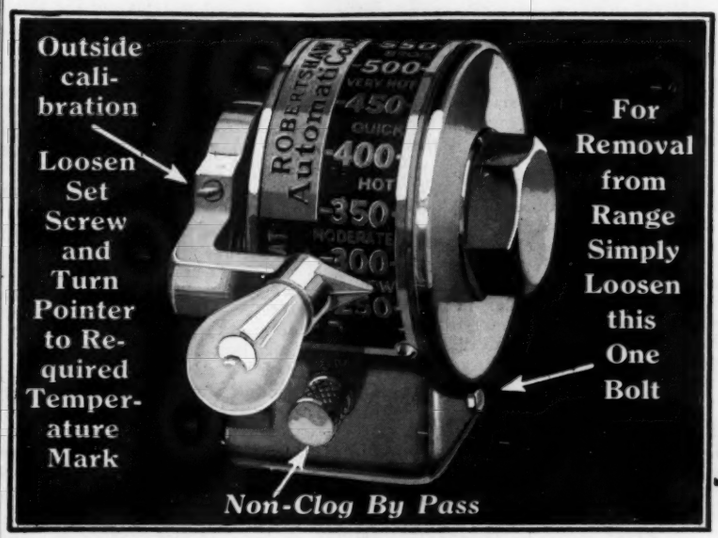
Natural gas used for industrial and domestic consumption in 1928 totaled 134,131,140 M. c. f., or 58 per cent of the total production. Consumption by carbon black plants in Louisiana in 1928 amounted to 98,500,000 M. c. f., or 42 per cent of the total.

SAN ANTONIO PUBLIC SERVICE CO. REPORTS FEB. INCREASE

Applications to the San Antonio Public Service Company for gas service during February show a substantial gain over the same month of 1929, according to a report given out by Mr. Siveley, manager of the commercial department of the company.

During February 1928, 328 applications were received as compared with 412 received during February of 1929.

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

GAS or WATER Connections

whether screw thread or gasket, should be made up with KEY SPECIAL PIPE JOINT COMPOUND.

KEY SPECIAL PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

Manufactured by

E. A. Key Co., Inc.

1431 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE

"Saga *of the* Bath" Unique Feature *in* Campaign

AS A DEVELOPMENT in an active campaign for increased water heater sales, the Southern Counties Gas Company has published, and placed on sale at Los Angeles book stores, a book called the "Saga of the Bath." The book was written by Walter D. Thurber, advertising and publicity director for the company, under the pseudonym of Walt Dennison, and gives in review the various bathing customs since the beginning of history. Mr. "Dennison" is autographing copies of the book for those customers returning a postcard request. The price at the bookstores in $1.00. The offer of the book was sent in an attractive piece of direct mail advertising, in which the new Walsbach Hotzone water heater is described and illustrated.

Another phase of the water heater sales campaign of the Southern Counties Gas Company is the newspaper advertising in which famous stars of filmland give their testimonials as to the benefits derived from the use of plenty of hot water. Anita Page, Joan Crawford, and Buster Keaton are among those who give their support to the movement to place the ideal of cleanliness before the public, and encourage the use of the automatic "gas-fired" water heater.

GAS WILL BE FEATURED DURING ENGINEERS' CONVENTION

Engineers from all sections of the United States and several foreign countries, representing many phases of engineering, will gather in Dallas, Texas, April 24, 25, and 26 for the spring convention of the American Society of Civil Engineers.

One of the important addresses will be delivered by Martin J. Insull of Chicago, president of the Middle West Utilites Company whose subject will be "Economic Changes in Industrial Life."

The greatest natural resources of the Southwest, oil and gas, will take an important part on the program.

TEXAS CITIES GAS COMPANY TO SERVE GALVESTON, TEX.

Natural gas is expected to be supplied to Galveston by the middle of April. Gas will reach the city through a line extending across Galveston Bay, which taps the trunk line of the Houston Pipe Line Company. The Texas Cities Gas Company will distribute the gas at the following rates:

First 3,000 cu. ft., 85 cents per M.
Next 5,000 cu. ft., 80 cents per M.
The next 7,000 cu. ft., 70 cents per M.
For all over 15,000 cu. ft., 65 cents per M.

In addition to the above charges for gas there is a service charge of 75 cents per meter per month.

MINE SAFETY APPLIANCES CO. WINS RICE TROPHY

The Mine Safety Appliances Company, Pittsburgh, Pennsylvania, was awarded the Cecil G. Rice Safety Trophy at the annual banquet of the safety school conducted by the Western Pennsylvania Safety Council, which was held at Syria Mosque, Pittsburg, Monday night, March 11. The Cecil G. Rice trophy is awarded annually to the company in Western Pennsylvania having the best safety record for the previous year. The announcement that the Mine Safety Appliance Company had won the award this year was received with great interest as this company is itself engaged in the manufacture of safety appliances.

C. W. Person Resigns *as* A.G.A. Publicity Chief

Charles W. Person, for nine years secretary of the Publicity and Advertising Section of the American Gas Association, has resigned his position to become affiliated on April 1 with the research organization of the Koppers Company, of Pittsburgh, Pennsylvania.

Mr. Person joined the headquarters staff of the American Gas Association in November 1919 as the first secretary of the Publicity and Advertising Section. He inaugurated the first publicity and advertising service sponsored by the Association, and was active in organizing the committees on public utility information. He was one of the founders of the Public Utilities Advertising Association and for several years has been a director and treasurer of that organization.

Mr. Person is widely known in the gas industry and has many friends among the advertising men of the electric light and power, street railway and telephone industries. For the past two years he has devoted part time to the work of the Joint Committee on National Utility Associations.

On March 1, a testimonial dinner was tendered Mr. Person at the Engineers Club of New York by associates in the American Gas Association and members of the advertising fraternity.

PLAN LIBRARY ON HEATING AND VENTILATING IN PITTSBURGH

The American Gas Association will take a part, together with several other organizations, in the establishment of a complete library devoted to the sciences of heating and ventilating. Other groups in this development are the American Society of Heating and Ventilating Engineers, the National Heating and Piping Contractors' Association, and the U. S. Bureau of Mines. It is proposed to establish the library in Pittsburgh, Pa.

The Executive Board of the A.G.A. has also approved three other research programs, covering the subjects of pipe joints. pipe coverings, and house cooling. In addition provision has been made for a fund for engineering research at universities and colleges that have conducted gas courses or gas research in the past.

GAS REFRIGERATION ADAPTED FOR FREIGHT CAR USE

Successful application of the gas-fired refrigerator to freight cars for the shipment of food is a recent development. No mechanical power is required, the operation being performed by heat from gas, carried in a tank on the car. Frozen fish, oranges and cantaloupes have been used on test trips. In one test the car was loaded with fish at a temperature of two degrees below zero. After the loading was completed the temperature was 18 degrees Fahrenheit; at the end of a journey lasting 11 days the temperature was 14 degrees Fahrenheit, or four degrees lower.

A. G. A. SALES COURSE POPULAR WITH SAN ANTONIO GAS MEN

The San Antonio Public Service Company, San Antonio, Texas, has included the American Gas Association sales course in the list of correspondence work which it will assist employees in undertaking. Ten members of the commercial department have already enrolled for the course and meetings are being held every two weeks for discussion of the text and application of its contents to local conditions.

SO. CALIF. GAS CO. HOLDS FIVE A.G.A. SALES COURSE CLASSES

Inauguration of five classes in the American Gas Association's Sales Course is announced by the Southern California Gas Company during the past month. Each division of the company will hold sessions, with 65 members enrolled throughout the system.

The class conducted for the Central Division, representing Los Angeles city, is under the direction of J. E. Kern, refrigeration engineer. The one for the Northern Division, with headquarters in Glendale, is under, is under the direction of H. E. Davidson, superintendent of appliance sales. George Bowersox, utilization engineer, will conduct the Southern Division class at Compton. W. F. Suess will supervise the Eastern Division Class at San Bernardino, and F. M. Banks, manager of the San Joaquin Valley Division, will conduct the Division's class at Visalia.

JAMES B. CLOW & SONS ISSUE HEATING MANUAL

James B. Clow & Sons, manufacturers of gas heating systems, have issued a new 48-page catalogue and data book for architects and heating engineers, featuring Clow Gasteam Heating.

Illustrations in the book are especially designed for architects and engineers, and give in detail the construction of the Clow Gasteam System. Suggestions as to the best method of installation, and the correct location for the heaters throughout the house are made.

A. J. HARDENDORF SECURES GAS FRANCHISE IN ELKHART, KAN.

A. J. Hardendorf and associates have been granted a gas franchise in Elkhart, Kansas, and a tentative franchise in Dodge City, Kansas. They propose to construct a gas pipeline from Elkhart to Dodge City which will tap the Hugoton gas field in Stevens County. Franchises will also be sought in Moscow, Santana, Sublette, Copeland, Montezuma, Ensign, Rolla and Hugoton.

William McKnabe of Winfield, Kans., and Arthur K. Lee, of Dodge City, are associated with Mr. Hardendorf in the project.

MADISON AND OLPE, KANSAS, TO HAVE NATURAL GAS

The city councils of Madison and Olpe, Kansas, recently granted a franchise to the Western Distributing Company to serve natural gas in that territory. The Western Distributing Company will start construction work on a distribution system in these towns in the near future.

AUBURN, WASH., GRANTS GAS FRANCHISE TO C. R. COLLINS

The city council of Auburn, Washington, granted a franchise late in February to Charles R. Collins, for the service of gas in that city. Work on the installation of mains will be underway shortly, and the city is expected to receive gas not later than September 1.

UNION CARBIDE & CARBON BUYS DENVER COMPANY

The Colorado Compressed Gas Company of Denver, Colorado, is now merged with the Union Carbide and Carbon Company. There will be no change in personnel, the Colorado company becoming a subsidiary of the Union Carbide and Carbon Company.

A Heater that Will Deliver a Gallon of Hot Water for Every *2 Feet of Manufactured Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St. San Francisco
2010 Jackson St. Dallas
242 So. Western Ave. Los Angeles

Stockton Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

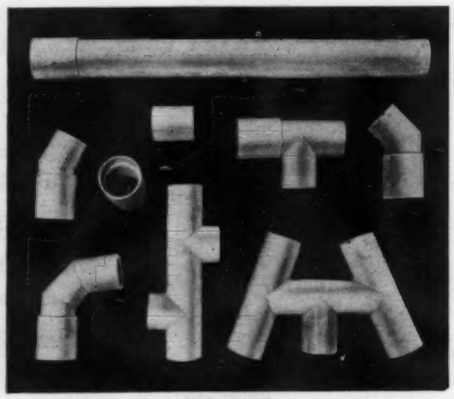
OFFICE: Russ Building, San Francisco

WORKS: Stockton, California

VITEX

Increases Draft

Improves Combustion



Absolutely Non-Corrosive

The Perfect Gas Vent and Flue Pipe

Samples, prices, and installation information gladly furnished on request

Manufactured by

Plant Rubber & Asbestos Works

537 Brannan Street, San Francisco, Cal.

Stauffer's

FERROX

Purifier

meets these essential requirements of a good Gas Purifier

A highly active Iron precipitate, with a high Iron content.
A thoroughly impregnated and porous bulky mass, ready to use, no delay, always uniform.

A dependable source of supply

Pioneer manufacturers of Industrial Chemicals on the Pacific Coast

Stauffer Chemical Company

624-638 California Street, San Francisco, California

CHARLES R. COLLINS ASKS FOR LONGVIEW, WASH. FRANCHISE

Charles R. Collins has applied to the city council of Longview, Washington, for a 50-year franchise for the service of gas to that city. Mr. Collins and associates desire to operate a gas plant and furnish manufactured gas. The interests which Mr. Collins represents have also secured a franchise in Kelso, Washington, recently.

GAS MAY NOW BE PIPED OUT OF OKLAHOMA

Acting Governor Holloway of Oklahoma has signed a bill to permit Oklahoma gas producers to pipe gas out of the state. This is an act of reciprocity, as provisions are being made to make it possible to pipe natural gas out of Kansas into Oklahoma.

SAN CLEMENTE, CALIF. MAY HAVE GAS SERVICE

Engineers of the Southern Counties Gas Company with headquarters in Los Angeles, California, are making a survey of San Clemente, California, for the purpose of preparing to serve the town with gas. It is expected that the company will extend its line from Laguna Beach to San Clemente.

ARKANSAS NATURAL TO SERVE NEW TERRITORY

The Arkansas Natural Gas Corporation has been granted an exclusive franchise to serve natural gas in Lonoke, Arkansas. Plans call for a pipeline to run from Little Rock to Lonoke, England, and Stuttgart, the supply coming from Monroe, Louisiana, and Clarksville, Arkansas fields.

E. S. STEPHENS LEAVES WICHITA GAS COMPANY

E. S. Stephens, credit manager of the Wichita Gas Company, of Wichita, Kansas, resigned on March 1 to become manager of the Aero Supply Company of that city. Mr. Stephens concludes 11 years of service with the Doherty Companies.

GEO. BLARDONE NOW PUBLICITY MANAGER FOR UNITED GAS CO.

George Blardone, formerly editor of the petroleum section of the Houston Post-Dispatch, has been appointed as manager of the publicity department of the United Gas Company, a Moody-Seagraves Corporation.

C. C. BAKER OF PARSONS, KANSAS, NOW WITH OKLAHOMA NATURAL

Clem C. Baker of Parsons, Kansas, has accepted a position with the Oklahoma Natural Gas Company of Tulsa, Oklahoma. Mr. Baker was formerly connected with the Union Public Service Company of Parsons, Kansas.

LEON H. ALBUS IS ASS'T CHIEF ENGR. OF GAS SERVICE CO.

Leon H. Albus, formerly head of the budget work for the Gas Service Company, has been appointed assistant to Charles Koinm, chief engineer. The appointment became effective on April 1.

SOUTH COAST GAS COMPANY ASKS PERMIT TO SERVE CARLSBAD

South Coast Gas Company of California, has applied to the State Railroad Commission for permit to exercise a franchise to extend its service into Carlsbad, near Oceanside.

FLAGSTAFF, ARIZONA, SOON TO HAVE NEW GAS PLANT

Construction work for the installation of the new gas plant in Flagstaff, Arizona, began on March 15, according to an announcement by R. A. Pettit, representing the construction company. Order for the pipe has been placed with Babbitt Brothers. C. B. Wilson, president of the Flagstaff Gas Company announced recently that the company will have gas available for distribution by the first of August.

Plans for the plant include a 50,000 cubic foot gas holder, a 10,000 cubic foot relief holder with oil and water scrubbers, boilers, and other structures and machinery. Buildings are to be steel frame and corrugated iron. About 10 miles of pipeline will be laid.

NEW RATE SCHEDULE FOR CALIF. TOWNS AUTHORIZED

A new rate schedule for the service of natural gas in Fellows, Maricopa, and Taft, Kern County, California, has been authorized by the State Railroad Commission and placed in effect by the West Side Natural Gas Company, which will result in a saving of approximately $7,000 a year to consumers.

The following rates will be in effect after April 15:

First $,000 cu. ft., per meter per month, 75c per M; next 10,000 cu. ft., per meter per month, 60c per M.; next 15,000 cu. ft., per meter per month, 45c per M.; over 30,000 cu. ft., per meter per month, 30c per M. Minimum charge: $1.00 per meter per month.

REVISED GAS RATE SCHEDULE AT COLORADO SPRINGS

A revised schedule of gas rates has recently been announced by the municipal gas company of Colorado Springs, Colorado, and has been approved by the city council of that city. Gas rates have not been lowered in the cost to the consumer for the amount of gas used, but a saving will be effected in the reduction of the minimum charge for small consumers. The customer charge in the combined house-heating and domestic rate and the optional service rate for the larger consumer are eliminated in the new schedule.

LEWISTOWN, MONTANA, WILL VOTE ON NATURAL GAS

The City Council of Lewistown, Montana, has called a special election of Lewistown property owners to vote on the petition of the Signal Hill Oil Company for a franchise to supply the city with natural gas.

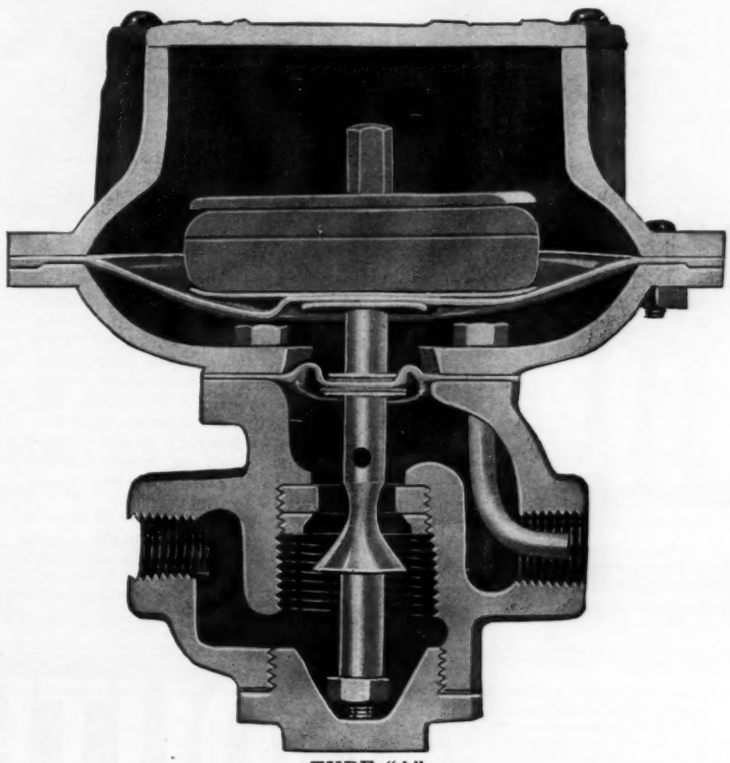
BILLINGS GAS CO. TO HAVE NEW MAINS SOON

Billings Gas Company, of Billings, Montana, has announced that an entirely new system of gas mains will be laid in the down-town district of the city, as soon as warmer weather begins. A 4,000-foot line of 6-inch steel pipe will replace the present 3½-inch mains. The pipe will be wrapped with fabric and coated with asphalt to prevent corrosion.

MODESTO GAS CO. SHOWS GAIN IN OPERATING REVENUE

Modesto Gas Company, of Modesto, California, reports an operating revenue for 1928 of $200,343.70, as compared with $193,-710.35 for 1927.

Reliance Low Pressure or Appliance Regulator



TYPE "A"

This type of regulator is designed for use directly on a gas supply to the appliance or for governing entire house supply up to the limits of inlet pressure and capacity.

Remarkable for its ability to maintain pressures under great demand. Capacity 50% to 100% greater than any other regulator on the market.

Built in sizes ⅜", ½", ¾", and 1".

Reliance Manufacturing Company

ALHAMBRA, CALIFORNIA

The great focal point of industrial development is always at the place where cheap fuel is available. Skilled labor and finance are ever ready to rally around the dependable, low priced fuel supply. The present tendency on the part of our Western utilities toward a downward revision of rates will have a profound effect not only on the gas industry itself, but on the upbuilding of the entire Western empire.

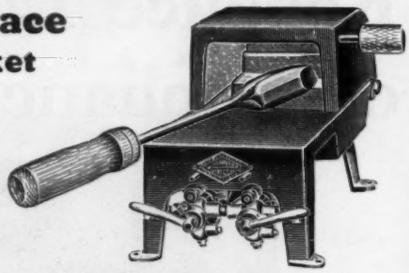
C. B. Babcock Co.

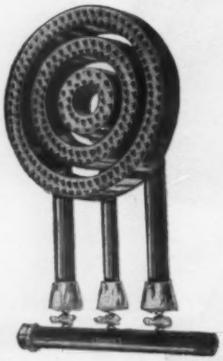
San Francisco Los Angeles

Exclusive Features Make the Johnson No. 101 Bench Furnace

Most Popular on Market

This famous soldering furnace will heat coppers up to 12 pounds per pair. The fire box is lined with a heavy refractory lining. A shelf in the rear of fire box forms a rest and protects the points of coppers. Quick, intense heat supplied by two powerful burners. No blower needed. Write for full details.





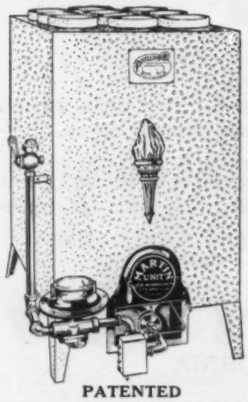
Johnson Triple Atmospheric Gas Burners

Powerful Concentric Types

The air and gas are delivered to these burners through the improved Johnson Venturi Air Mixers and Tubes and heavy A. G. A. Type Valves equipped with Johnson Patented Direct Jet Regulator. The Johnson Regulator makes an absolute gas adjustment and delivers the gas into the burners under greater jet velocity. These features produce perfect combustion and this results in much higher flame temperature. Free Catalog gives full details. Write for it!

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Pacific Coast Representative:
C. B. Babcock Co.
135 Bluxome Street
San Francisco, Calif.



PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE

MADE IN FOUR SIZES

Electric, Thermostat or Manual Control Approved by A. G. A. Laboratory and by the City of Los Angeles

Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.

1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Interest *in* A.G.A. Sales Course *is* Extensive

WITHIN 30 days after the American Gas Association had announced the inauguration of a course in domestic gas salesmanship, more than 1,000 enrollments were sent in to Association headquarters from member companies, appliance manufacturers and dealers from all parts of the United States and Canada, and even from South America.

The course in domestic gas salesmanship is based on a practical and comprehensive survey of selling methods, and is conducted by means of text books, sales cases and sales meetings. The text books constitute a practical series of six volumes dealing with gas and gas appliance salesmanship, which provide the basis for interesting home study. The books are full of illustrations and incidents from daily sales experience. There are six sales cases in all, each of which includes a vivid account of a typical interview between a salesman and a customer, with a number of questions regarding the handling of the interview. The answers to these questions are sent in by those enrolled, reviewed by the staff conducting the course, and returned with a complete analysis of the situation. These sales cases tie in closely with daily sales activities.

Enrollment for the course may be made at any date, the only requirement being that a sufficient number of students be enrolled at a given time to permit the holding of the sales meetings in connection with each unit of the course. The subscription price is $25.00 per enrollment. Many of the gas companies are sharing the expense of the course in some manner with their salesmen.

The American Gas Association has published a complete list of interesting material describing in detail what the course contains, how it operates and what it will do for the gas appliance salesman. Copies of this material may be had by addressing J. W. West, Jr., American Gas Association, 420 Lexington Avenue, New York.

The course is divided into six sections or units. Among the topics covered are:

Unit I. Finding Out the Customer's Needs. What questions to ask customers and how to ask them in order to start the sale right. How to avoid the untimely price question. How to find out whether your customer is ready to buy. How to make the quick sale.

Unit II. Explaining the Appliance. How to explain the construction and operation of appliances simply and quickly. How to make your explanation help to sell. What makes an appliance give the best results, the "why" and "how" of every appliance from the customer's point of view.

Unit III. Convincing the Customer. How to make a definite plan for your selling talks. How to demonstrate appliances in the most effective way. How to use sales equipment. The eight factors which make a sales talk effective. Methods of closing the sale with the average customer.

Unit IV. Handling the Difficult Sale. Answers to typical questions that come up in connection with selling gas and gas appliances. How to forestall the usual objections and turn them to selling advantage. How to meet competition constructively. How to deal with questions regarding price and cost of operation. How to do business with various types of customers.

Unit V. Building the Gas Load. The advantages of being "load-minded." Showing your customers how to get the best use out of appliances. How to advise your customers about their cooking problems. How to sell indirectly by "sales-slanting" all of your contacts. How to suggest new uses for gas and to sell more gas outlets.

Unit VI. Reaching Out For New Business. How to locate prospective customers. How to get prospects to come to the store for demonstrations and how to handle follow-up. Contracting builders, contractors and prospective home owners. How to get the biggest dollar-and-cents return from your time. How to develop yourself in a way that will make greater future sales for you.

ROSWELL, N. M., WILL HAVE GAS FROM VANDEGRIFF WELL

Pecos Valley Gas Company has started construction work for its gas pipeline from the Vandegriff well to Roswell, New Mexico. The line will be of 6⅝-inch pipe and will run from the well across the Pecos river, to the Pecos Valley highway, 1½ miles south of Hagerman, and from there to Roswell. Lateral lines will be laid from the main line to serve Lake Arthur, Hagerman, Greenfield, and Dexter.

ARKANSAS NATURAL GAS CORP. GIVES EMPLOYEE BANQUET

Employees of the Arkansas Natural Gas Corporation and its subsidiary, the Southern Cities Distributing Company, were entertained at a banquet at the Washington Hotel at Shreveport, Louisiana, recently. D. W. Harris, vice-president and general manager of the company, presided at the banquet, which was given primarily to make the employees better acquainted, and to make them more familiar with the operations of the company.

JAMES DONOVAN NOW WITH FLAGSTAFF GAS CO.

James L. Donovan, formerly of the Tracy Gas Company, has severed his connection with this organization to become manager of a new gas property in Flagstaff, Arizona, the plant of which is now under construction, and is being built by Thebo, Starr & Anderton, construction engineers, with offices in San Francisco.

NEW BRANCH OFFICE OF PACIFIC GAS AND ELEC. CO. READY

The South San Francisco office building of the Pacific Gas and Electric Company is completed at a cost of approximately $8,000. It is one-story, frame with brick, and is of modern type with overhanging tile roof. Situated on a corner, the large windows on both streets as well as a lobby at the entrance will give ample space for the display of equipment.

WALTER STUDE IS NOW WITH SANTA MARIA GAS CO.

Walter Stude, formerly with the Southern Counties Gas Company at Santa Barbara, has joined the organization of the Santa Maria Gas Company, Santa Maria, where he is in charge of sales.

AMERICAN GAS CONSTRUCTION ASKS LONGVIEW FRANCHISE

The American Gas Construction Company of Newton, Iowa, through D. C. Tenney, secretary, recently made application for the franchise to serve Longview, Washington, with manufactured gas.

What's This Baby Digger Doing?

Digging Trench Where the Digging's Mighty Tough!

The Baby Digger shown in the illustration above is cutting trench out in a western state. It is delivering four feet per minute through a foot or more of frost and is shown here digging right through a small creek. "Mighty tough," is putting it mild.

That Baby Diggers have been able to deliver these most satisfactory results under such extreme conditions, is due to the fact that they are precision built of the finest steels in accordance with advanced engineering principles.

They have proven under many tests, that a trencher may be extremely compact, light in weight and mobile, yet powerful enough to meet the most severe tests of soil and adverse weather conditions.

You will find the Baby Digger a most usable piece of trench equipment, usable on more than 90 per cent of your jobs. Write for information immediately.

THE CLEVELAND TRENCHER CO.

"Pioneers of the Small Trencher"

20100 St. Clair Ave. Cleveland, Ohio, U. S. A.

Edward R. Bacon, Inc., 17th at Folsom Streets, San Francisco, California

THE BABY DIGGER

Fire Brick Contractors

Established 1906

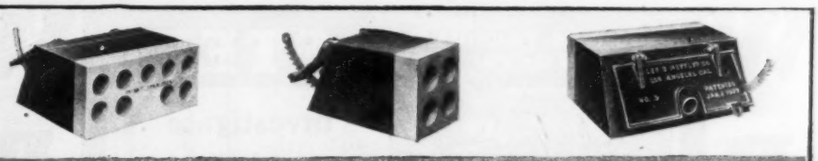
J. T. Thorpe & Son

Inc.

Specializing in Gas Generator, Boiler, Still and Furnace Brick, Industrial Furnaces, Retorts, Kilns, Brick Smokestacks.

A capable Engineering Department competent to advise on any problem involving firebrick construction.

San Francisco	Seattle	Portland	Los Angeles
417 Market St.	305 White Bldg.	609 Ry. Exch. Bldg.	321 W. 3rd St.



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

EMPIRE Oil Meters

Positive Displacement Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES ⅝" TO 6"

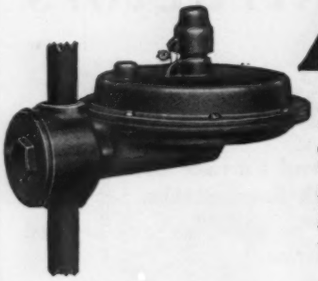
Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 300 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **645 Santa Fe Avenue, Los Angeles**

MODEL 10 SERIES
With or Without Mercury Seal



Spring Type
Also furnished in Dead Weight Type

Reynolds Gas Control Since 1892

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS — Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

VALVE—Automatic Quick Closing Anti Vacuum.

REYNOLDS GAS REGULATOR COMPANY
Anderson, Indiana

W P & S

DESIGNERS, FABRICATORS & ERECTORS OF PRODUCTS OF STEEL

Investigate WESTERN Hi-Pressure Unit Gas Holders

WESTERN PIPE & STEEL COMPANY OF CALIFORNIA
5717 Santa Fe Ave. LOS ANGELES — 444 Market Street SAN FRANCISCO
FACTORIES: LOS ANGELES · SOUTH SAN FRANCISCO · FRESNO · PHOENIX · TAFT

W P & S

EXCESS GAS PRODUCTION IS PROBLEM IN ALBERTA, CAN.

Alberta's problem of waste gas has been giving concern to leaders of the industry, who now are viewing the piping of surplus gas to Saskatchewan and Manitoba, and the cities of Montana to the south as a possible solution. Interviewed at Lethbridge, Alberta recently, Hon. Charles Stewart, minister of the interior, gave it as his opinion that the transportation of gas 800 miles to Winnipeg, to serve intermediate cities en route, including Moose Jaw and Regina, was entirely feasible. He also stated that exportation of gas from the Rodgers Field, southeast of Lethbridge is now possible under federal permit. The Range Oil and Gas Company has spudded in another well on the Rodgers' Dome, just south and east of the 60,000,000-foot producer. Plans of this company and the Hardrock Oil Company of Great Falls, which will drill the wells, are to have gas flowing through their pipe-line into Montana by winter.

Another year may see the market for Alberta's excess gas production utilized on the markets east and south, particularly, as stressed by Mr. Stewart, in view of the Canadian federal government's unfavorable attitude toward the drilling of new wells until a market for the gas has been found.

S. P. C. A. APPROVES GAS AS HUMANE LETHAL AGENT

Gas as a humane method of dispatching sick and homeless animals is being tested in several communities. The Society for the Prevention of Cruelty to Animals of Point Grey, B. C., has approved a lethal kennel to which gas pipes are connected. The City Pound of Everett, Washington, has constructed a chamber of heavy sheet steel, electrically welded at the joints, with a heavy plate glass top, enabling the operator to watch the effects of the gas.

MONTERREY, MEXICO, WILL HAVE NATURAL GAS

Survey of the gas transmission line to cross the international boundary line to Monterrey, Mexico, is being made, and construction of the line will begin early in the spring, according to an announcement received recently. The line will be constructed by Moody Seagraves interests.

A. O. SMITH CORP. ISSUES NEW BULLETIN

A. O. Smith Corporation, of Wisconsin, manufacturer of steel products, has issued a new bulletin featuring Autoclaves and jacketed vessels. The booklet gives a description of the technology used in manufacturing Smithwelded vessels, with illustrative material. A brief history of the corporation is given on the final page.

STORE SURPLUS GAS IN POROUS SAND AT TURNER VALLEY

The Imperial Oil Company is conducting an experiment in storage of surplus gas in a porous sand formation at its Turner Valley, Alberta, properties, from which the city of Calgary is supplied gas. The move is a step in the direction of gas conservation.

$50.00
for gas appliance salesmen. **See page 36.**

History repeats itself

WHEN they first appeared, the vacuum cleaner, the washing machine and a score of other familiar household articles were looked upon as luxuries, pure and simple — extravagant domestic toys for those who could furnish their homes without regard to expense. Then, almost overnight, they were seen everywhere. Their manifest usefulness had made them an indispensable part of the equipment of the modern home.

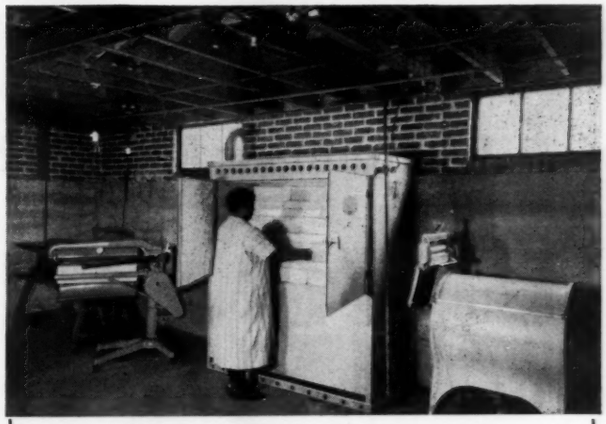
Today, in the case of the automatic gas water heater, history is repeating itself. Automatic water heaters have passed out of the luxury class. The average housewife has realized that a water heating system can be obtained which gives a plentiful and uninterrupted supply of hot water, without any of the trouble, worry and delay of old-fashioned heating methods, and she will not rest content until she has such a device installed in her own home.

Progressive gas companies throughout the country have found that the group of Automatic Water Heaters built by The Cleveland Heater Co. furnish the most satisfactory answer to this wide-spread demand. The Cleveland Heater Co. has an automatic water heater for every price class, and in each class its product holds an acknowledged leadership. The finest engineering skill, the most conscientious workmanship and the experience of more than twenty years, guarantee their dependability — no better assurance of quality could be asked.

There is much to interest you in the booklet, "Rex Partnership Plan for Gas Companies." Write for it.

The Cleveland Heater Co.

1900 West 112th St. Cleveland, Ohio



Women *Do* Want a Good Dryer

IN EVERY well-organized home the family washing is done on the same day each week. But if it rains on washday the clothes must be hung on make-shift, indoor lines—or the washing must be postponed. And this raises Ned with the weekly household schedule.

The LAMNECK LAUNDRY DRYER

permanently solves this biggest of washday problems. It affords **perfect** drying conditions on every washday. Women do want a good dryer—and they will buy a good dryer if your sales representatives will pay them a personal visit.

Most women prefer to have their laundry work done at home—that's why millions of washers have been sold—but they frequently send the washing out because of the uncertainty of the weather. And your company suffers a decrease in the domestic load.

The Lamneck boosts this load directly by 1200 cu. ft. per month and indirectly by guaranteeing the use, at least one day each week, of washer, ironer, water heater, laundry stove and other appliances—averaging 22,000 cu. ft. annually per domestic meter. We'll be glad to give you complete information about the Lamneck Laundry Dryer.

The W. E. Lamneck Company

443 Dublin Avenue

Columbus Ohio

Gladding, McBean & Co.

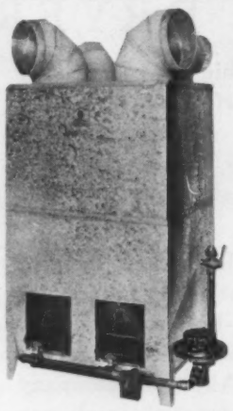
FIRE BRICK

Manufacturers of a Full Line of High Grade
REFRACTORIES
For Boiler Settings, Industrial Furnaces, Dutch Ovens, Etc.

SHAPE WORK A SPECIALTY

Also Fire Clay Chimney Pipe, Chimney Tops,
Flue Linings, Gas Flues.

Los Angeles	Oakland	Fresno	San Francisco
621 So. Hope St.	22nd and Market	(San Joaquin	445 Ninth St.
TRinity 5761	Oakland 0262	Materials Co.)	Douglas 0540



Furnace Service

How much of your overhead is represented by unnecessary trips to your job?

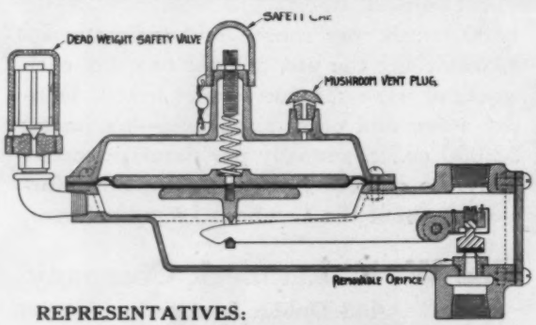
In other words does your furnace or your service man render your service?

Install **Perfection Multiple Unit Furnaces** and cut down on your overhead.

TESTING LABORATORY APPROVED

L. H. Freymuth Jr

311 East Pico St., Los Angeles



PRESSURE REGULATION FOR ALL REQUIREMENTS

REPRESENTATIVES:
Seidenglanz & Co., Santa Fe Building, Dallas.
Midland Supply Co., Dwight Building, Kansas City.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

U. S. GAS PRICE LEVEL IS ONLY 28 PER CENT ABOVE 1913

Household consumers throughout the United States now are buying artificial gas for light and heat at a price level which is nearer to the pre-war standard than that of other necessities which go to make up the general csot of living.

This is shown by a study of prices charged for artificial gas in all principal cities in the quantity in which it is purchased by household consumers. The study was made by the U. S. Department of labor, whch constructed a series of index numbers showing fluctuations in gas prices for the United States as a whole. In some cities, prices are higher than the average computed by the department. In others, they are lower. The department's data, therefore, show the price trend for the country as a whole.

In 1927 gas sold at an average price which was 28 per cent above the 1913 price, while the general cost of living showed an advance of 72 per cent above pre-war, according to the official data.

The price of gas declined from 1922 to 1927, while the cost of living increased from 1922 to 1925. From 1925 to 1927 living costs turned downward.

HIGH SERVICE STANDARDS IN CALIFORNIA INDUSTRY

In its annual report recently released the Railroad Commission of California produces data which show a high standard of service to be maintained by gas companies within the Commission's jurisdiction. The Commission's engineers made 23 inspections as to the quality of gas service rendered by the companies serving 60 per cent of gas consumers of the state. To insure accuracy of meters they tested 32 meter-provers, but one of which was found defective.

BERLIN, GERMANY, TO HOLD GAS AND WATER EXHIBITION

Berlin, Germany, is laying plans for the 1929 Gas and Water Exhibition which will be held there April 19 to July 21. A spectacular exhibition is promised, and it is expected that an area of 312,000 sq. ft. will be used for the display. A miniature gas plant 10,700 sq. ft. in size, is a feature of the exhibition, the size of which will permit a visitor to walk through the entire plant.

A. V. JONES NAMED GENERAL MGR. OF TRENCHER CO.

The Cleveland Trencher Company, Cleveland, Ohio, manufacturers of Cleveland trenchers, recently announced the appointment of A. V. Jones as its general manager. Mr. Jones was until recently merchandise sales manager for the Buffalo General Electric Company, with whom he has never been associated for the past twenty years.

J. H. SATTERWHITE MAKES TRIP TO PACIFIC COAST

J. H. Satterwhite, general manager of Westcott and Greis, of Tulsa, Oklahoma, was on the Pacific Coast during the month of March. While there Mr. Satterwhite made a survey of all high pressure gas distribution systems in California.

ATHENS, ARK., TO HAVE NATURAL GAS IN NEAR FUTURE

A franchise was granted to the public Utilities Company at Athens, Arkansas, late in January, for the service of natural gas to that city.

ELSINORE AND NUEVO, CAL., NOW ON SO. CAL. GAS CO.'S LINE

On March 9, the Southern California Gas Company, with headquarters in Los Angeles, served its first customers in the city of Elsinore, California. Pipe for the line was delivered on February 26, and 11 days later the work was completed on the six-mile extension from the Corona-Alberhill line. The Southern California Gas Company expects to begin serving the town of Nuevo, in the same district, by the 10th of April.

JACKSON COUNTY LIGHT, HEAT, POWER SYSTEM BOUGHT

Announcement is made that the Gas Service Company has purchased the Jackson County Light, Heat and Power distribution system which serves gas to the city of Independence, Missouri, and part of the territory between Kansas City and Independence. The property was purchased from the Dawes interests of Chicago.

L. L. Garner, formerly manager of the Newton Gas Company, has been named to manage the Jackson County Light, Heat and Power Company at Independence, Missouri.

PUEBLO, COLO., TO HAVE NEW BOOSTER STATION

Construction of a $600,000 booster station near Pueblo, Colorado, on the natural gas pipeline from the Texas Panhandle to Denver will be started soon, according to a statement by H. F. Benson, gas line representative. Two sites for the booster station are under consideration, according to Mr. Benson. One location is at Devine, 10 miles east of Pueblo, and the other at the junction of the gas line with the Purgatorie river, east of Trinidad.

HAVRE NATURAL GAS CO. SOLD TO MONTANA-DAKOTA CO.

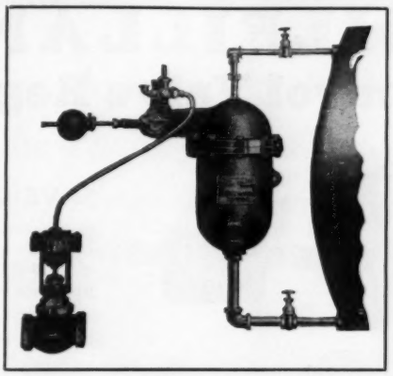
Montana-Dakota Gas Company, subsidiary of the Montana Dakota Power Company, has purchased controlling interest in the Havre Natural Gas Company of Havre, Montana, and the Chinook Gas Company of Chinook. The purchase of the Featherstone interests which formerly controlled the Havre and Chinook companies, is a step in the development program of the Montana-Dakota Gas Company, to supply natural gas to several eastern Montana and western South Dakota cities.

APPLICATIONS FOR SERVICE IN VANCOUVER TOTAL 2144

Approximately 33 miles of new gas mains have been laid in greater Vancouver and New Westminster within the past six months, according to a statement issued by the B. C. Electric Railway Company's gas department. The company received 2144 applications for new gas services in homes and apartment houses, bringing the total of domestic gas users on the lower mainland to 40,000.

MONTANA-DAKOTA GAS CO. ELECTS OFFICERS

Montana-Dakota Gas Company at a meeting on March 5, elected the following officers and directors for the ensuing fiscal year: R. M. Heskett, of Minneapolis, president; C. W. Smith of Minneapolis, vice-president; F. R. Gamble, secretary-treasurer, and E. C. Carruth, assistant secretary-treasurer. Directors in addition to the above are: A. F. Lamey, and F. W. McCarthy of Havre, Montana; and John Featherstone of Chinook.



CF

Dependable—of course

The Vigilant Liquid Level Regulator, by remote control, is designed to maintain a constant oil level in both the absorbing tank and the still, where gasoline is manufactured by absorbing the gasoline in oil and subsequently separating it from the oil by distillation.

This regulator will accommodate itself to any type of absorber or steam still, and maintain a constant oil level under pressure.

Thirty-five years of successful experience in the manufacture of regulators assure to the purchaser absolute accurate and reliable equipment.

Write for Catalogue

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 1,600 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc. Sales and Service
Dallas — Los Angeles — Tulsa
Or Any Jobber

JNO. W. CRAWFORD Sales Engineer
1855 Industrial Street Los Angeles

HOT-N-KOLD

The Hot-N-Kold Shops are now serving the public in eight cities in the northern part of California with Kelvinator Refrigeration, Holbrook Ranges, Welsbach Water Heaters, and other major appliances.

A valuable business franchise awaits the right dealer in every town.

HOT-N-KOLD CORPORATION

949 Mission Street **San Francisco, California**

GILFILLAN
Dual Control Valve Regulators

SAVE ONE INSTALLATION

Maintain a constant steam pressure on the boiler
and
Reduce and maintain an unvarying gas pressure to the burner regardless of the variation in line pressure.

Built to control Boiler pressure from one pound to 200 pounds steam, and deliver as low as two ounces gas pressure at the burner.

Write for literature

GILFILLAN MACHINE WORKS, Inc.
Ebenezer, Erie Co., N. Y.

Representatives
Jensen Instrument Co., 624 E. Fourth St., Los Angeles, Calif.
Gas Appliance Service Corp, 2014 Bryan St., Dallas, Texas.
The Diamond Supply Co., Charleston, W. Va.

The Magic Way Company

Gas Heating Devices

including

"Magic Way" Gas Furnaces
"Magic Way" Control Valves and Switches
"Potter" Radiators
"Steel Made" Radiators
"Cole" Floor and Wall Heaters
"Hall" Floor Furnaces

Manufactured by

Magic Way Company
National City San Diego California

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

SITUATIONS WANTED—MALE

Young married man having several years experience in gas utility merchandising and manufacturer's representation, who is especially qualified in handling men and promoting sales campaigns, desires new business position with utility. Best references. Address, B-20, care of *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

PUBLIC UTILITY AD BOOK IS NOW AVAILABLE

Officials of the Public Utilities Advertising Association announce that the 1928 portfolio of public utilty advertsng, a book of 168 pages reproducng 650 advertisements, is now available and may be secured from Donald M. Mackie, Allied Power and Light Company, Jackson, Michigan, at $10 a copy.

ELECTRICALLY WELDED HOLDER AT GRASS VALLEY, CALIF.

At Grass Valley, California, the Pacific Gas and Electric Company has completed a new electrically welded gas holder, containing neither rivets nor bolts, and representing an innovation in holder construction. It is 31 feet in diameter, 16 feet in height, and has a capacity of 10,000 cubic feet.

UNIQUE FRANCHISE GRANTED AT DARDANELLE, ARK.

The city council of Dardanelle, Arkansas, has granted a unique franchise to W. C. Tegtmeier for the service of natural gas in that locality. The franchise provides that Mr. Tegtmeier must begin drilling for gas within a radius of seven miles of the town within 90 days after receiving the permit. This provision in the franchise is made in order to develop the field near Dardanelle.

SAN DIEGO CONSOLIDATED GAS CO. REVENUE SHOWS GAIN

The operating revenue of the San Diego Consolidated Gas and Electric Company of San Diego, California, showed a substantial gain over the previous year. During 1927 the operating revenue amounted to $6,590,-280.48, while in 1928, $6,860,568.86 was the figure.

L. A. G. AND E. GAS WORKS TEAM WINS FIRST AID PRIZE

The Gas Works First Aid team of the Los Angeles Gas and Electric Corporation won the first prize of the 14 company teams competing in a First Aid Contest on February 27. The team won out with only 4¼ discounts.

$50.00
for gas appliance salesmen. **See page 36.**

Burrell All Service Gas Mask

M-S-A Combination Hose Mask

Announcing A Complete Safety Service for the Pacific Coast Trade

The Mine Safety Appliances Company of Pittsburgh, Pa., announces the opening of a Pacific Coast Branch at 318 East Third Street, Los Angeles, California, where a complete stock of established M-S-A Products is carried to serve the western gas and oil trade.

A Complete Line of Gas Protecting, Detecting and Resuscitating Equipment

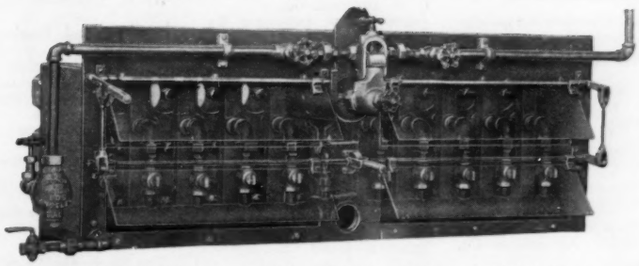
M-S-A Safety Equipment includes such well-known products as the Burrell All Service Gas Mask, the only mask that will protect against all poisonous gases; the M-S-A Combination Hose Mask, for entering and working in confined spaces where high concentrations of gas or oxygen deficiencies exist; the H-H Inhalator for resuscitating victims of gas poisoning; the Carbon Monoxide Detector, First Aid Materials, etc., etc.

We Welcome the Opportunity to Serve You!

Mine Safety Appliances Co.

Braddock, Thomas and Meade, Pittsburgh, Pa.

"Everything for Mine and Industrial Safety"



View showing Leahy Combination Gas and Oil Unit

The Leahy Multi-Jet Unit

Combination Oil and Gas

Designed for Horizontal, Front, Rear and Vertical Firing
A highly efficient unit with these outstanding advantages:

1—High overload on low gas pressure.
2—Complete combustion and low stack temperatures.
3—Designed for expansion and contraction, eliminating warping and cracking.
4—Oil Burner can be inserted or removed instantly.
5—Equal efficiency gas or oil.

An Efficient, Indestructible, Portable Unit with a Low Initial and Upkeep Cost.

Request literature, data, and installation prints on our

GAS AND OIL BURNING EQUIPMENT

Leahy Manufacturing Co.

1804-1810 East Eighth Street *Established 1902* **Los Angeles, Calif.**

A WESTERN GUIDE to INDUSTRIAL PURCHASING

Readers interested in any articles not listed in these pages are cordially invited to advise *Western Gas* of their wants and every effort will be made to furnish a list of the proper manufacturers. Addresses of companies listed on these pages may be found by consulting their advertisements in this issue.

Absorption and Compression Plant Equipment
Chaplin-Fulton Mfg. Co.
Jensen Instrument Co.
The E. A. Key Company
Western Pipe & Steel Co.

Absorption Towers
Western Pipe & Steel Co.

Adjustable Plugs
Western Pipe & Steel Co.

Agitators
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Aluminum Bronze Powder for Paint
Hill, Hubbell & Co.

Analyzers
Fort Worth Laboratories.
Smith-Emery Co.

Apparatus, Experimental Gas
The Bartlett Hayward Co.
Pacific Meter Works.

Appraisals and Valuations
Smith-Emery Co.
United Engineers & Constructors, Inc.

Bags, Gas Main
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Barometers
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Westcott & Greis, Inc.

Bench Iron Work
The Bartlett Hayward Co.
General Gas Light Co.

Blocks and Tiles, Fire Clay
Gladding, McBean & Co.
Stockton Fire Brick Co.

Blowers and Boosters
Ingersoll-Rand Co.
Connersville Blower Co.
The P. H. & F. M. Roots Co.
United Engineers & Constructors, Inc.

Boiler Controls
The Cleveland Heater Co.
Gilfillan Machine Works, Inc.

Boiler—Brickwork
J. T. Thorpe & Son, Inc.

Boiler Equipment
E. A. Key Co.

Boiler Maker's Tools
E. A. Key Co.

Boilers, Gas-Fired
American Radiator Co.
C. B. Babcock Co.
Leahy Mfg. Co.

Boiler Settings, Pipe and Boiler Insulation
J. T. Thorpe & Son, Inc.

Boilers, Waste Heat
The Bartlett Hayward Co.
Phillips Heating, Ventilating & Mfg. Co.
United Engineers & Constructors, Inc.

Boilers, Water Tube
Western Pipe & Steel Co.

Breakers
Ingersoll-Rand Co.

Breeching (Boiler and Stack)
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Brick, Firebrick
Gladding, McBean & Co.
Stockton Fire Brick Co.
United Engineers & Constructors, Inc.

Brick, Firebrick—Installation
J. T. Thorpe & Son, Inc.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Buildings, Steel
United Engineers & Constructors, Inc.
Western Pipe & Steel Co.

Bulletin Boards
Mine Safety Appliances Co.

Bunkers, Steel and Concrete
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Burners, High Pressure
Leahy Mfg. Co.
Lee B. Mettler.
Rotary Manufacturing Co.

Burners, Low Pressure
C. B. Babcock Co.
The Bartlett Hayward Co.
L. H. Freymuth
General Gas Light Co.
Johnson Gas Appliance Co.
Leahy Mfg. Co.
Lee B. Mettler.
Pacific Gas Radiator Co.
Payne Furnace & Supply Co.
Phillips Heating, Ventilating & Mfg. Co.
Rotary Manufacturing Co.
Western Pipe & Steel Co.

Burners—Oil
Leahy Mfg. Co.
Rotary Manufacturing Co.

By-Product Recovery Apparatus
The Bartlett Hayward Co.

Calorimeter Accessories
Fort Worth Laboratories.
Pacific Meter Works.
United Engineers & Constructors, Inc.

Carbon Monoxide Detector
Mine Safety Appliances Co.

Carbon Monoxide Masks
Mine Safety Appliances Co.

Carbon Monoxide Recorders
Mine Safety Appliances Co.

Cases, Meter
Pacific Meter Works.
Pittsburgh Equitable Meter Co

Casinghead, Gas Meters
The Bristol Company
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.

Casing and Tubing (steel)
South Chester Tube Co.

Casing—Iron
South Chester Tube Company

Cast Iron Pipe
United States Cast Iron Pipe and Foundry Co.

Castings
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Cement
Stockton Fire Brick Co.

Cement, High Temperature
Stockton Fire Brick Co.

Centrifugal Pipe
United States Cast Iron Pipe and Foundry Co.

Charging Machines (retort, etc.)
The Bartlett Hayward Co.

Checker Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Chemical and Gas Testing Apparatus
Fort Worth Laboratories.
Pacific Meter Works.
Stauffer Chemical Co.
United Engineers & Constructors, Inc.
Westcott & Greis, Inc.

Chemists, Analytical
Fort Worth Laboratories.
Smith-Emery Co.

Chimneys, Radial Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Chimneys, Radial Brick Installation
J. T. Thorpe & Son, Inc.

Chutes (coal, coke, ash)
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Clamps and Sleeves, Pipe
S. R. Dresser Mfg. Co.
Mueller Co.

Clamps, Service
Mueller Co.

Cleaners, Service
C. B. Babcock Co.
Pacific Meter Works.

Coal Gas Plants
Charles R. Collins.
The Bartlett Hayward Co.

Cocks
A-B Stove Company
C. B. Babcock Co.
Johnson Gas Appliance Co.
Leahy Mfg. Co.
Merco Nordstrom Valve Co.
Mueller Co.
Geo. D. Roper Corporation.

Collectors, Dust
Western Pipe & Steel Co.

Compressors, Air
Ingersoll-Rand Co.
Leahy Mfg. Co.

Compressors, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, High Pressure
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Portable
Ingersoll-Rand Co.

Condensers
The Bartlett Hayward Co.
Ingersoll-Rand Co.

Controllers
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
The Foxboro Co., Inc.
Robertshaw Thermostat Co.

Controls, Air and Steam
The Bartlett Hayward Co.
The Bristol Company
The Foxboro Co., Inc.
Jensen Instrument Co.

Cooling Systems
The Bartlett Hayward Co.

Cooling Towers
J. B. Gill Corporation.

Counters, Revolution
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.

Couplings
S. R. Dresser Mfg. Co.
The Bartlett Hayward Co.

Couplings—Flexible Rope & Spider Arm
The P. H. & F. M. Roots Co.

Coverings (Flat and Corrugated)
L. H. Freymuth

Cubic Foot Bottle
Pacific Meter Works.

Cutters, Pavement
Ingersoll-Rand Co.

Cylinders, Compressors
The C. & G. Cooper Co.

Danger Signals
Safety Gas Main Stopper Co.

Dephlegmaters
Western Pipe & Steel Co.

Diaphragms, Meter
Chaplin-Fulton Mfg. Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co

Diggers, Clay
Ingersoll-Rand Co.

Discharging Machines (retort, etc.)
The Bartlett Hayward Co.

Drills
Ingersoll-Rand Co.
Mueller Co.

Drill Pipe—Iron
South Chester Tube Company

Drill Pipe—Steel
South Chester Tube Company

Dryers—Laundry
W. E. Lamneck Co.

Engineers and Engineering Service
Charles R. Collins.
J. B. Gill Corporation.
The Bartlett Hayward Co.
Smith-Emery Co.
United Engineers & Constructors, Inc.
Western Pipe & Steel Co.

Engines, Diesel
The C. & G. Cooper Co.

Engines, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.
United Engineers & Constructors, Inc.

Engines, Oil
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Engines, Steam
Ingersoll-Rand Co.

Evaporating Apparatus
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Excavators, Ditch and Trench
The Cleveland Trencher Co.

Exchangers, Heat
Western Pipe & Steel Co.

Exhausters
Connersville Blower Co.
Ingersoll-Rand Co.
United Engineers & Constructors, Inc.
United States Cast Iron Pipe and Foundry Co.
The P. H. & F. M. Roots Co.

Experimental Apparatus
The Bartlett Hayward Co.
Pacific Meter Works.

Filters
United States Cast Iron Pipe and Foundry Co.

Fire Clay and Products
Gladding, McBean & Co.
Stockton Fire Brick Co.

Fire Brick Contractors
J. T. Thorpe & Son, Inc.
Stockton Fire Brick Co.

First Aid Supplies
Mine Safety Appliances Co.

Fittings
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Fixtures, Lighting (Domes, Portables, etc.)
C. B. Babcock Co.
Welsbach Company.

Fire Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Flanges
Pittsburgh Equitable Meter Co
Westcott & Greis, Inc.

Forgings
Payne Furnace & Supply Co.
Geo. D. Roper Corporation.
J. T. Thorpe & Son, Inc.

Furnaces, Floor
Electrogas Furnace Co.
Magic Way Company
Pacific Gas Radiator Co.
Payne Furnace & Supply Co.

Furnaces, Heating
The Estate Stove Co.
L. H. Freymuth
Payne Furnace & Supply Co.
Magic Way Company.
Pacific Gas Radiator Co.
Phillips Heating, Ventilating & Mfg. Co.

Furnaces, Industrial
C. B. Babcock Co.
Johnson Gas Appliance Co.
Leahy Mfg. Co.
Mueller Co.
Payne Furnace & Supply Co.

Gas Analysis Apparatus
The Foxboro Co., Inc.
Fort Worth Laboratories.
Jensen Instrument Co.
Mine Safety Appliances Co.
Pacific Meter Works.
United Engineers & Constructors, Inc.

Gas Indicators
Mine Safety Appliances Co.

Gas Masks
Mine Safety Appliances Co.
Safety Gas Main Stopper Co.

Gas Main Tapping & Drilling Machines
Mueller Co.

Gaskets
The E. A. Key Company
Pittsburgh Equitable Meter Co
Safety Gas Main Stopper Co.

Gasket Compound
E. A. Key Co.

Gas Pipe Line Construction
Western Pipe & Steel Co.

Gates—Wind & Blast
The P. H. & F. M. Roots Co.

Gauges
The Bristol Company
Fort Worth Laboratories.
The Foxboro Co., Inc.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Westcott & Gries, Inc.

Gauges, Steam
The Bristol Company
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Gries, Inc.

The

Bartlett Hayward Co.

Engineers and Founders

BALTIMORE NEW YORK

DESIGNERS AND BUILDERS
OF
COMPLETE COAL GAS PLANTS

CARBURETTED WATER GAS PLANTS

BY-PRODUCT PLANTS

DE BROUWER CHARGING AND DISCHARGING MACHINES

SALT WATER AND FRESH WATER CONDENSERS

PURIFIERS

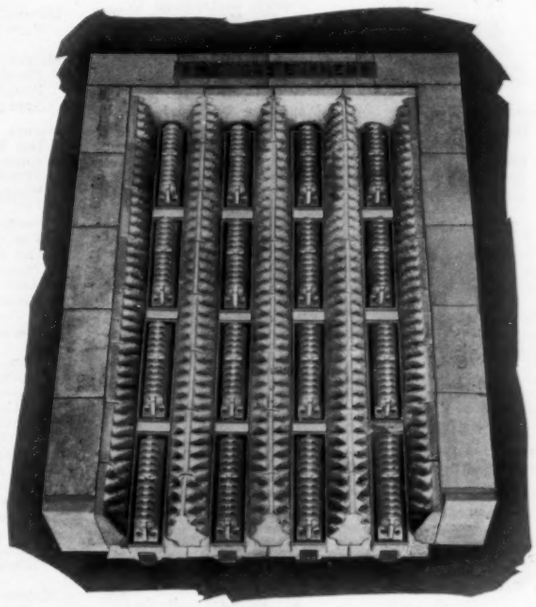
SHAVING SCRUBBERS

CENTRIFUGAL VERTICAL TYPE SCRUBBERS

STEEL TANKS

VERTICAL WASTE HEAT BOILERS

GAS HOLDERS



The above cut illustrates an arrangement of 16 R. M. C. Gas Burners set in R. M. C. Radiant Tile.

The R. M. C. Gas Burner operates on a new principle. Combustion is complete at all gas pressures. Although it requires no shutters, mixing valves, or other mechanical air regulating devices the primary air is always supplied in the proper proportion required for complete combustion. It produces a snappy, high temperature flame.

The R.M. C. Radiant Tile setting provides a means of more effectively transmitting to the heating surfaces, by radiation, the high temperatures produced by the R. M. C. Gas Burners.

Its conical projections not only increase its radiating surface but assist in mixing the secondary air, which enters between the tile and the burners, with the mixture of gas and primary air issuing from the burner heads. These conical projections become incandescent when the burners are in operation.

The tile are made in short sections and can be readily arranged to accommodate any number of burners.

Additional information will be cheerfully furnished on request.

ROTARY MANUFACTURING COMPANY

5720 Long Beach Ave. **Los Angeles, Calif.**

Gauges, U Type
C. B. Babcock Co.
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Lee B. Mettler.
Pacific Meter Works.
Safety Gas Main Stopper Co.
The Foxboro Co., Inc.
Westcott & Gries, Inc.

Generators, Water Gas
The Bartlett Hayward Co.

Glassware
Fort Worth Laboratories.
Westcott & Gries, Inc.

Gloves, Industrial
Mine Safety Appliances Co.

Goggles
Mine Safety Appliances Co.

Governors
C. B. Babcock Co.
Chaplin-Fulton Mfg. Co.
L. H. Freymuth
Pacific Meter Works.
Reynolds Gas Regulator Co
Sprague Meter Co.
Westcott & Greis, Inc.

Hammers
Ingersoll-Rand Co.

Hanger, Meter
Mueller Co.

Heaters
American Radiator Co.
C. B. Babcock Co.
The Estate Stove Co.
L. H. Freymuth
General Gas Light Co.
Magic Way Company.
Payne Furnace & Supply Co.
Phillips Heating, Ventilating & Mfg. Co.
Welsbach Company.

Heaters, Floor
General Gas Light Co.
Magic Way Company.
Pacific Gas Radiator Co.
Payne Furnace & Supply Co.

Heaters, Wall
C. B. Babcock Co.
General Gas Light Co.
Magic Way Company.
Pacific Gas Radiator Co.
Payne Furnace & Supply Co.

Heat Exchangers
Western Pipe & Steel Co.

Heat Interchangers
Western Pipe & Steel Co.

Hoists
Ingersoll-Rand Co.

Holders
The Bartlett Hayward Co.
United Engineers & Constructors, Inc.

Holders, High Pressure
Western Pipe & Steel Co.

Hoppers
The Bartlett Hayward Co.

Hose, Air
Ingersoll-Rand Co.

Hot Plates
A-B Stove Company
C. B. Babcock Co.
Johnson Gas Appliance Co.
Geo. D. Roper Corporation.

Hygrometers
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Incinerators
C. B. Babcock Co.
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Incinerator Brickwork
J. T. Thorpe & Son, Inc.

Indicators
United Engineers & Constructors, Inc.
Westcott & Greis, Inc.

Inhalators, H-H
Mine Safety Appliances Co.

Instruments (Measuring, Testing and Recording)
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Pacific Meter Works.
The Foxboro Co., Inc.
United Engineers & Constructors, Inc.
Westcott & Gries, Inc.

Insulating Materials
L. H. Freymuth
Stockton Fire Brick Co.

Joint Runners Asbestos
Safety Gas Main Stopper Co.
United Engineers & Constructors, Inc.

Kilns
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Kilns—Brickwork
The Bartlett Hayward Co.

Laboratory Supplies
Fort Worth Laboratories.
Mueller Co.
Westcott & Greis, Inc.

Ladles, Hot Metal
Mueller Co.

Lamps
C. B. Babcock Co.
General Gas Light Co.
Welsbach Company.
Mine Safety Appliances Co.

Laundry-Dryers
W. E. Lamneck Co.

Lighters
C. B. Babcock Co.
Tappan Stove Co.

Lighting Incidentals
C. B. Babcock Co.
Welsbach Company.

Line Pipe—Steel
A. O. Smith Corporation
South Chester Tube Company

Linings—Brickwork
J. T. Thorpe & Son, Inc.

Main, Bags
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Mains, Street
United Engineers & Constructors, Inc.
United States Cast Iron Pipe and Foundry Co.

Main, Stopper
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Mantles, Gas Lighting
C. B. Babcock Co.
General Gas Light Co.
Welsbach Company.

Manometers
Fort Worth Laboratories.
Jensen Instrument Co.
Lee B. Mettler.
Westcott & Greis, Inc.

Meters, Air
The Bristol Company
Connersville Blower Co.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.
The P. H. & F. M. Roots Co.
United Engineers & Constructors, Inc.
Westcott & Greis, Inc.

Meters, Boiler
The Bristol Company
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.

Meters, Burner Test
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Cast Iron Gas
The Bartlett Hayward Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meter Connections
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Complaint
Pittsburgh Equitable Meter Co

Meters, Consumers
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Flow
The Foxboro Co., Inc.
Jensen Instrument Co.
Pittsburgh Equitable Meter Co
Westcott & Greis, Inc.

Meters, Fluid
The Bristol Company
The Foxboro Co., Inc.
Jensen Instrument Co
National Meter Company
Pittsburgh Equitable Meter Company
Westcott & Gries, Inc.

Meters, Gas
Connersville Blower Co
Jensen Instrument Co.
National Meter Company
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
The P. H. & F. M. Roots Co.

Meters, Gasoline and Oil
Jensen Instrument Co.
National Meter Company
Pittsburgh Equitable Meter Co
Westcott & Gries, Inc.

Meters, High Pressure Distribution
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
National Meter Company
Pittsburgh Equitable Meter Co
Pacific Meter Works.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, High Pressure Iron Case
The E. A. Key Company
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Industrial Consumers
The Bristol Company
Connersville Blower Co.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
The Foxboro Co., Inc.
The P. H. & F. M. Roots Co

Meters, Iron Case
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Laboratory
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Large Capacity
Connersville Blower Co.
Jensen Instrument Co.
Pacific Meter Works.
Sprague Meter Co.
The P. H. & F. M. Roots Co.
Westcott & Greis, Inc.

Meters, Oil
Connersville Blower Co.
The Foxboro Co., Inc.
Jensen Instrument Co.
National Meter Company
Pittsburgh Equitable Meter Co
The P. H. & F. M. Roots Co.
Westcott & Greis, Inc.

Meters, Orifice
Jensen Instrument Co.
Pacific Meter Works.
Robinson Orifice Fitting Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Oxygen
Fort Worth Laboratories.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Oxygen and Hydrogen
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Prepayment
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Station
Connersville Blower Co.
The Bartlett Hayward Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The P. H. & F. M. Roots Co.

Meters, Steam
The Bristol Company
Jensen Instrument Co.
The Foxboro Co., Inc.
United Engineers & Constructors, Inc.
Westcott & Greis, Inc.

Meters, Test
Fort Worth Laboratories
Pacific Meter Works.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Water
Jensen Instrument Co.
National Meter Company
Westcott & Greis, Inc.
Pacific Meter Works.

Meters, Wet Test
Pittsburgh Equitable Meter Co

Methane Recorders, Continuous
Mine Safety Appliances Co.

Mixers, Gas and Air
C. B. Babcock Co.
Geo. D. Roper Corporation.
Pacific Gas Radiator Co.

Oil, Diaphragm
Pacific Meter Works.

Oven Heat Control
Robertshaw Thermostat Co.

Oxide
C. B. Babcock Co.
Stauffer Chemical Co.

Oxygen Breathing Apparatus
Mine Safety Appliances Co.

Packing, Asbestos
Safety Gas Main Stopper Co.

Paint
Hill, Hubbell & Company.
McEverlast, Inc.
United Engineers & Constructors, Inc.

Photometers
Pacific Meter Works.
United Engineers & Constructors, Inc.

Pilots
The Cleveland Heater Co.
Payne Furnace & Supply Co.
L. H. Freymuth

Pipe
A. O. Smith Corporation
United States Cast Iron Pipe and Foundry Co.
Western Pipe & Steel Co.

Pipe Compound
E. A. Key Co.

Pipe, Copper
Mueller Co.

Pipe Covering
Hill, Hubbell & Company.

Pipe Couplings
S. R. Dresser Mfg. Co.

Pipe Cutter
W. W. Strickler & Bros.

Pipe—Iron
South Chester Tube Company

Pipe—Steel
A. O. Smith Corporation
South Chester Tube Company

Pipe Jointers
Mueller Co.

Plugs (testing mains and running service)
C. B. Babcock Co.
Jensen Instrument Co.
The Foxboro Co., Inc.
Safety Gas Main Stopper Co.
United States Cast Iron Pipe and Foundry Co.

Pre-Heaters
Western Pipe & Steel Co.

Producers, Gas
United Engineers & Constructors, Inc.
United States Cast Iron Pipe and Foundry Co.

Provers, Meter
Pacific Meter Works.
Pittsburgh Equitable Meter Co

Pumps
C. B. Babcock Co.
Connersville Blower Co.
Ingersoll-Rand Co.
Mueller Co.
Pacific Meter Works.
Geo. D. Roper Corporation.
Safety Gas Main Stopper Co.
The P. H. & F. M. Roots Co.

Pumps—Liquid
The P. H. & F. M. Roots Co.

Pumps—Vacuum
The P. H. & F. M. Roots Co.

Purifiers
The Bartlett Hayward Co.
United Engineers & Constructors, Inc.

Purifying Materials
C. B. Babcock Co.
Stauffer Chemical Co.
United Engineers & Constructors, Inc.

Purifiers, Oil Absorption
Western Pipe & Steel Co.

Pyrometers (Indicating and Recording)
The Bristol Company
Fort Worth Laboratories
Jensen Instrument Co.
Westcott & Greis, Inc.

Radiants
C. B. Babcock Co.
General Gas Light Co.

Radiant Heaters
C. B. Babcock Co.
General Gas Light Co.
Pacific Gas Radiator Co.
Welsbach Company.

Radiators—Gas Fired
American Radiator Co.
Magic Way Company.
Pacific Gas Radiator Co.

Ranges
A-B Stove Company
C. B. Babcock Co.
The Estate Stove Co.
Geo. D. Roper Corporation.
Tappan Stove Co.

Ranges, Closed Top
C. B. Babcock Co.
Geo. D. Roper Corp.
Tappan Stove Co.

Receivers, Air
Ingersoll-Rand Co.
Western Pipe & Steel Co.

Recorders
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Refrigerating Machinery
C. & G. Cooper Co.
Ingersoll-Rand Co.

Refractory Materials
Gladding, McBean & Co.
Stockton Fire Brick Co.
United Engineers & Constructors, Inc.

Regulators, Heat
American Radiator Co.
C. B. Babcock Co.
Leahy Mfg. Co.
Magic Way Company.
Payne Furnace & Supply Co
Phillips Heating, Ventilating & Mfg. Co.
The Foxboro Co., Inc.

Regulators, High Pressure
C. B. Babcock Co.
Leahy Mfg. Co.
The Bristol Company
Chaplin-Fulton Mfg. Co.
Fort Worth Laboratories.
Gilfillan Machine Works, Inc.
Reliance Mfg. Co.
Mueller Co.
Reynolds Gas Regulator Co.
Sprague Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Hot Water Heat Control
The Bristol Company
Mueller Co.

Regulators, Low Pressure
C. B. Babcock Co.
The Bristol Company
Chaplin-Fulton Mfg. Co.
L. H. Freymuth
Fort Worth Laboratories.
Gilfillan Machine Works, Inc.
Phillips Heating, Ventilating & Mfg. Co.
Reliance Mfg. Co.
Mueller Co.
Reynolds Gas Regulator Co.
Sprague Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Temperature
C. B. Babcock Co.
The Bristol Company
Fort Worth Laboratories
Jensen Instrument Co.
Leahy Mfg. Co.
Magic Way Company.
Payne Furnace & Supply Co.
Phillips Heating, Ventilating & Mfg. Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Oven
C. B. Babcock Co.

Repairs—Brickwork
J. T. Thorpe & Son, Inc.

Retorts
The Bartlett Hayward Co.
United Engineers & Constructors, Inc.

Respirators
Mine Safety Appliances Co.

Riveted Pipe
The Bartlett Hayward Co.

Rotisserie
C. B. Babcock Co.
General Gas Light Co.

Safety Equipment
Mine Safety Appliances Co.
Safety Gas Main Stopper Co.

Scrubbers
The Bartlett Hayward Co.
United Engineers & Constructors, Inc.
Western Pipe & Steel Co.

Service Cleansers, Renrut
Safety Gas Main Stopper Co.

Settings, Boiler and Bench
J. T. Thorpe & Son, Inc.

Sheet Metal
Western Pipe & Steel Co.

Signs, Danger
Mine Safety Appliances Co.

Sleeves
S. R. Dresser Mfg. Co.

Soap Tape
Safety Gas Main Stopper Co.

Specials
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Stacks, Steel
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Stand Pipes
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Steel Plate Construction
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Steel Work, Structural
Western Pipe & Steel Co.

Stills
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Stoppers, Gas Main
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Stoppers, Goodman Cylindrical Intermediate Pressures
Safety Gas Main Stopper Co.

Stops, Brass
Mueller Co.

Stops, Iron Body
Mueller Co.

Strainer, Gas, Water, Air, and Oil
Mueller Co.

Systems—Heating
American Radiator Co.
C. B. Babcock Co.
Magic Way Company.
Payne Furnace & Supply Co.
Phillips Heating, Ventilating & Mfg. Co.

Systems, Hot Water Heat Control
The Cleveland Heater Co.
Mueller Co.

Tachometers
The Bristol Company
Jensen Instrument Co.
Westcott & Greis, Inc.
The Foxboro Co., Inc.

Tanks
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Thermometers (Indicating and Recording, etc.)
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Thermostats, all kinds
American Radiator Co.
C. B. Babcock Co.
The Bristol Company
The Cleveland Heater Co.
Payne Furnace & Supply Co.
Phillips Heating, Ventilating & Mfg. Co.
Robertshaw Thermostat Co.
Spencer Thermostat Co.

Tile, Refractory
Gladding, McBean & Co.
Stockton Fire Brick Co.

Tools
Mueller Co.
Safety Gas Main Stopper Co.

Traps, Steam
Jensen Instrument Co.

Trench Excators
C. B. Babcock Co.
The Cleveland Trencher Co.

Tubing—Iron
Mueller Co.
South Chester Tube Company

Tubing—Steel
South Chester Tube Company

Unions
Leahy Mfg. Co.
Mueller Co.
Pittsburgh Equitable Meter Co.

Valves, Back Pressure
C. B. Babcock Co.
The Bristol Company
Chaplin-Fulton Mfg. Co.
Jensen Instrument Co.
Reynolds Gas Regulator Co.
Westcott & Greis, Inc.

Valves, Electro-Magnetic
C. B. Babcock Co.
The Bristol Company
Magic Way Company.

Valves, Gas Engine
The C. & G. Cooper Co.

Valves, Gate
The Bartlett Hayward Co.

Valves, Needle for Gas Stoves
C. B. Babcock Co.

Valves, Relief
The Bartlett Hayward Co.
Chaplin-Fulton Mfg. Co.
Jensen Instrument Co.
Leahy Mfg. Co.
Mueller Co.
Reynolds Gas Regulator Co.
The P. H. & F. M. Roots Co.

Valves, Plug
Jensen Instrument Co.
Merco Nordstrom Valve Co.

Varnishes
Hill, Hubbell & Company.

Vulcanizers (Tube) Gas
Reliance Mfg. Co.

Washers
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Water Gas Equipment
The Bartlett Hayward Co.

Water Heaters
The Cleveland Heater Co.
Pacific Gas Radiator Co.
Rotary Manufacturing Co.
Welsbach Company.

Yarn, Calking
Safety Gas Main Stopper Co.

FISHER House Service Gas Regulators or Reducing Valves are built in two types. No. 205 (shown above) with Mercury Seal Relief Valve. No. 206 with and without Dead Weight Safety Valve. **Complete details given in Bulletin 7—write for a copy.**

FISHER Gas Regulators are adapted for use on practically every low p easure domestic or industrial installation. They are suitable for both natural and artificial gas and can be used for air and other gaseous fluids. They may be used with any initial or high pressure up to 50 lbs. When it is necessary to distribute gas through the mains at high pressures, these regulators are applied to each service connection for maintaining the required low pressure. Usually the Type No. 205 is installed inside the house or building, while the Type No. 206 is intended for outside installations or field use. The two types, however, are often used for both inside and outside installations. The type of regulator selected usually depends on the installation conditions or the personal preference of the buyer or engineer. Both types will operate with the same precision and maintain an even reduced pressure. Their industrial uses are many, as they are applied to gas-fired process cooking and to ovens and kiln burning gas. The proper operation of a gas refrigerator is assured by the use of a regulator to hold an even gas pressure on the burners. Candy factories, bakeries, hotels, and restaurants all secure better food products and better results when using these specialties with their gas-fired equipment.

Your special attention is called to the designs of these specialties for strength to resist rough handling, neatness of appearance for ready sale, construction for satisfactory regulation, and other features permitting easy installation and maintenance.

Dependable

This in "a word" expresses the **real value** of FISHER House Service Gas Regulators. Years of skilled engineering talent—years of testing—years of experience—and the resources of a gigantic "50-year-old" organization stands behind and guarantees the economical efficiency of these units. You will want to know about them—write for Bulletin No. 7.

THE FISHER GOVERNOR CO.
Marshalltown, Iowa
2400 Fisher Bldg.

FISHER

Since 1880—the foremost builder of automatic and sensitive control devices.

DIRECTORY

Byllesby Engineering and Management Corporation

231 S. La Salle Street
CHICAGO

New York Pittsburgh San Francisco

THE FORT WORTH LABORATORIES
Instrument Department
Meriam Manometers *Tycos* Instruments
Laboratory Apparatus
828¼ Monroe Street Fort Worth, Texas

WALTER REID
CONSULTING NATURAL GAS ENGINEER
ATHLETIC CLUB BUILDING, DALLAS

SMITH-EMERY CO.
Chemists—Engineers
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
920 Santee St. Los Angeles
651 Howard St. San Francisco

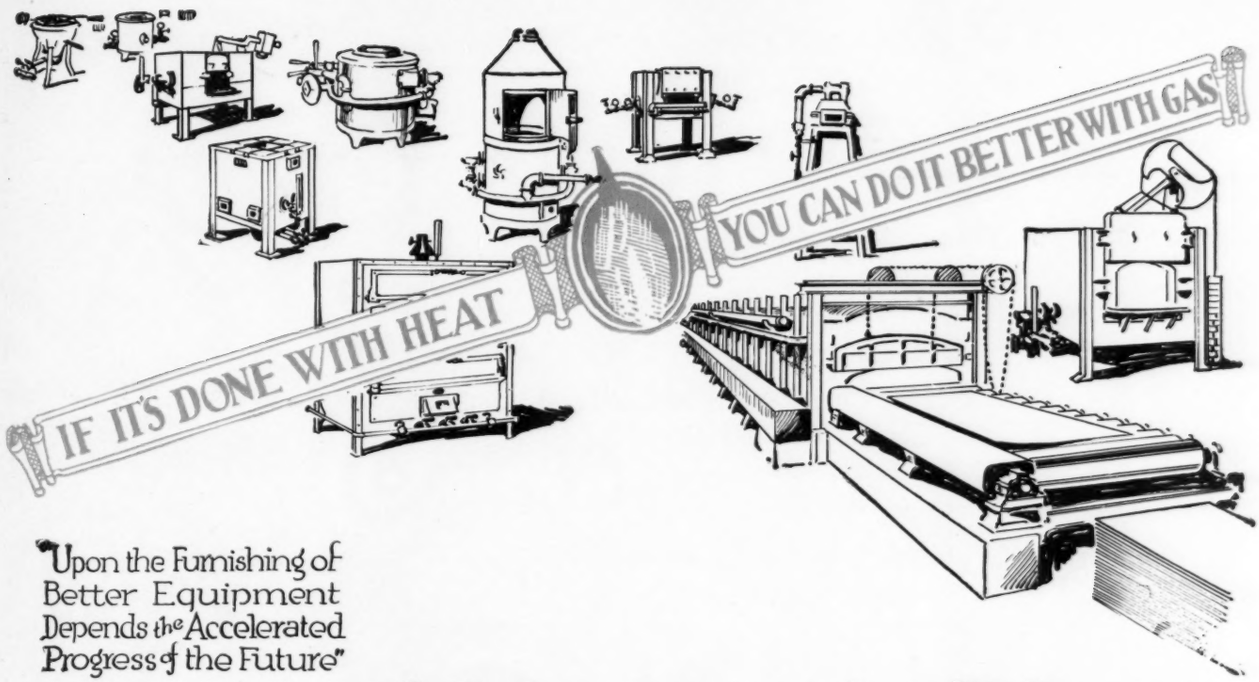
J. B. GILL CORPORATION
NATURAL GAS ENGINEERS
COMPRESSOR PLANT DESIGN AND CONSTRUCTION
P. O. BOX 669 LONG BEACH, CALIFORNIA

CHAS. R. COLLINS
Management, Operation, Examinations, Appraisals Relating to Manufactured Gas
4424 White Building
SEATTLE, WASHINGTON

JENSEN INSTRUMENT CO.
Pyrometers—Recorders—Controllers
Draft Gages—CO_2 Instruments—Steam Traps
Thermometers—Chemical Glassware
Orifice Meters—Manometers
624 East 4th Street Los Angeles, Calif.
950 Parker St., Sta. A. Berkeley, Calif.

Advertisers' Index

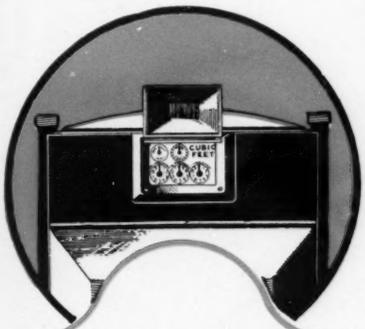
A-B Stove Company —
American Radiator Co. 53
C. B. Babcock Company 59
The Bartlett Hayward Co. 69
The Bristol Company 2
California Oxide Co. 54
The Chaplin-Fulton Mfg. Co. 65
The Chambers Manufacturing Co. —
Cleveland Heater Company 63
Cleveland Trencher Company 61
The Connersville Blower Co. 4
The C. & G. Cooper Co. 1
S. R. Dresser Manufacturing Company 11
Electrogas Furnace Co. 52
Estate Stove Company —
The Foxboro Company 9
The Fisher Governor Co. 71
L. H. Freymuth, Jr. 64
General Gas Light Co. 49
Gilfillan Machine Works, Inc. 66
Gladding, McBean & Co. 64
Groble Gas Regulator Co. 64
Hill, Hubbell & Co. 7
Hot-N-Kold Corporation 65
Ingersoll-Rand Co. —
Johnson Gas Appliance Co. 60
E. A. Key Co., Inc. 56
The W. E. Lamneck Co. 63
Leahy Manufacturing Co. 67
McEverlast, Inc. 10
Magic Way Company 66
Merco Nordstrom Valve Co. Second Cover
Lee B. Mettler Co. 61
Mine Safety Appliances Co. 67
Mueller Co. —
National Meter Company 62
Pacific Gas and Electric Company 45
Pacific Gas Radiator Company 47
Pacific Meter Works Third Cover
Payne Furnace and Supply Co., Inc. —
Phillips Heating, Ventilating & Mfg. Co. 60
Pittsburgh Equitable Meter Company 13
Pittsburg Water Heater Co. 57
Plant Rubber & Asbestos Works 58
Reliance Manufacturing Company 59
Remington Rand Business Service, Inc. 14
Reynolds Gas Regulator Company 62
Robertshaw Thermostat Co. 55
Robinson Orifice Meter Co. 54
The P. H. & F. M. Roots Co. 12
Geo. D. Roper Corporation —
Rotary Manufacturing Co. 69
Safety Gas Main Stopper Co. 6
A. O. Smith Corporation 5
South Chester Tube Co. 60
Sprague Meter Co. Back Cover
Stauffer Chemical Company 58
Stockton Fire Brick Company 57
W. W. Strickler & Bros. 52
Tappan Stove Co. —
J. T. Thorpe & Son 61
Tulsa Stove & Foundry Co. —
United Engineers & Constructors, Inc. 16
U. S. Cast Iron Pipe and Foundry Co. 3
Wailes Dove-Hermiston Corp. 8
Welsbach Company 51
Western Pipe & Steel Company 62



"Upon the Furnishing of Better Equipment Depends the Accelerated Progress of the Future"

With Increasing Gas Utilization

Quality Equipment Grows in Importance



PACIFIC METERS

Tinned Steel Case	
B Type	C Type
5- 150	6- 600
10- 300	11- 1120
20- 450	25- 2500
30- 600	40- 4000
60-1200	60- 6000
100-1800	170-17500
200-3100	

Rated capacities at ½" loss

The more varied utilization and the increasing consumption of gas have laid added emphasis on the importance of Quality as an inherent part of modern gas meter design and construction.

Quality manufacture throughout is a first consideration in the production of Pacific Meters It is insured by the long experience and the unsurpassed facilities of American Meter Company.

The many refinements in design and improvements in construction described in our Catalogue are other factors of importance in successfully meeting modern requirements for the measurement of gas.

In addition — Pacific Meters are manufactured on the Coast. Factory Specialization in the needs of customers insures the utmost in satisfactory service and in meter performance.

PACIFIC METER WORKS

Specializing in the Manufacture of Gas Meters and Allied Apparatus for Pacific Coast Requirements

San Francisco **Established 1901** **Los Angeles**

NORTHWESTERN REPRESENTATIVES: Northwest Gas and Electric Equipment Company, Portland, Ore.

Six Major Improvements

(1)

Sprague Special Diaphragms—

Acid resisting, semi-chrome retanned leather

(2)

Enclosed top bracket—

Protects and lubricates the worm and gear.

(3)

Improved valve cover—

Eliminates possible breakage in transit.

(4)

Raised bosses on flanges—

Eliminate seepage in wet gases.

(5)

Bronze bushed links—

Reduce wear and lost motion.

(6)

Improved adjusting tools—

Reduce shop costs.

All designed to better the one and a half million Sprague Meters in service.

THE SPRAGUE METER CO.

Bridgeport, Conn.

Los Angeles San Francisco